Roting Teachers: Progressive Math Pedagogy and the Development of Non-Teaching Experts in Teaching in the United States, 1820-1910

By

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University mathematics education research has long advocated progressive pedagogy, focusing on students' agency in constructing their own math understandings in contrast to "traditional" or "rote" instruction. This advocacy is part an over 180-year long tradition of pedagogical experts across content areas who wrote—and still write—about progressive pedagogy in their work in normal schools, university schools of education and university academic departments. Drawing on the idea that skill is socially constructed, in this dissertation I analyze experts' publications on pedagogy to explore how they constructed not only their own skill but that of teachers.

I argue that, through their articulations of progressive pedagogy, pedagogical experts constructed their own skill in relation to their construction of teachers as having an intransigent absence of skill. Pedagogical experts portrayed teachers as teaching by "rote," and thus as "rote" or manual workers, simply by nature of being classroom teachers. In contrast, they constructed themselves as agentic and creative student-advocates who would intervene on "rote" teachers on students' behalf through their mental labors. By examining this process from 1820 to 1910 during the early development of normal schools and research universities, I consider how pedagogical progressivism not only legitimated the expertise of non-teachers in teaching, but also forged an area of academic expertise in fixing teachers on behalf of the child. My case is mathematics education, which has a paradoxical reputation as both having a propensity to "rote" and to being a paragon of creative and rational thinking. In this way, math has facilitated the representation of teachers as unyieldingly "rote" when math instruction could be so much more, contingent on the intervention of experts.

The introduction (Chapter 1) provides some illustrative examples of pedagogical experts' characterization of teachers and a literature review on perspectives for analyzing the work of teachers and pedagogical experts. I motivate the emphasis on math pedagogy with a vignette on Warren Colburn's famous arithmetic textbook. Colburn's early progressivism is illustrative of two of the dissertation's related themes; the articulation of "practical" instruction or philosophy and the articulation of claims to increasingly abstract knowledge. The following three chapters take up progressive pedagogy in normal schools (Chapter 2), schools of education (Chapter 3) and university mathematics (Chapter 4).

Chapter 2 considers the evolution of the progressive "science of pedagogy" from the early 1800s, as normal schools were first arriving on the teacher education scene in the U.S., to the late 1800s as the science of pedagogy made tentative first steps into the university. I argue that even though early textbook writers explicating the science of pedagogy cited their teaching experience as the source of their theory and its legitimacy, the relevance of teaching experience to authoritative knowledge about teaching was

gradually eclipsed. I consider how the increasing irrelevance of teaching experience was brought to be through the development of progressive pedagogy in three phases. This includes the antebellum effort to write authoritative texts on teaching, the Reconstruction era importation of pedagogical expertise toward training an increasingly female teaching force, and early efforts to bring pedagogy to the university.

Chapter 3 revisits John Dewey's efforts to both theoretically and administratively forge an education department at the University of Chicago amidst its rapid development as a research university between 1894 and 1904. I argue that, even as he developed a democratic vision of progressive pedagogy, Dewey rewrote the same divide between mental and manual labor that he sought to eviscerate through his distinction between "doing something in particular" versus "actual doing something." I illustrate this distinction through a consideration of Dewey's descriptions of his own academic project at the University of Chicago amidst the burgeoning Chicago labor movement, his comparison between teachers' and experts' capacity for knowledge production, his theorizing about "the child," and his leadership of a private laboratory school. I also explain that, even as Dewey developed his more general pragmatist philosophy, he co-opted, abstracted and stereotyped the philosophical sentiments of the "plain man" in order to legitimate his emphasis on "experience" and practical concerns.

Chapter 4 turns to the development of "pure" mathematics in the early research university and its influence on math pedagogy from 1876 to 1903, focusing on the influence of the mathematics departments at Johns Hopkins and the University of Chicago. Akin to professors of education, mathematics professors organized for removal from teaching as part of a broader attempt to avoid work that was "rote." At the same time, they claimed knowledge above and beyond that of teachers about teaching, prescribing that students be taught in professors' image as non-"rote," "active producers" of knowledge. Both professors of education and mathematics turned to the exploration of the "foundations" of their fields in avoidance of calculations and application. And yet, for students, they recommended quite the opposite—"practical mathematics," with familiar concrete objects as opposed to formal abstractions and rules—as a means of becoming "active producers." In this way, they co-opted the constructiveness of work even as they argued against the constructiveness of the teachers who were purportedly subjecting students to unending "rote" instruction. I close with a discussion on the development of teachers' content-related professional organizations and unions during the first two decades of the 1900s, and how each form of organization, despite initial claims of making teachers the "active producers" of their own occupational destiny, acquiesced to the view that teachers were "rote" and substantially included experts in their organization.

The conclusion of the dissertation situates teachers' dilemma of being caught between mental ("active," or "actually doing something") and manual ("rote," or "doing something in particular") labor in the Covid-19 pandemic and battles over school building closure. I discuss implications for teacher education; namely, that even as "progressive pedagogy" claims to professionalize teachers, it does so by teaching them that teachers are inevitably rote workers. I also consider that much of the resources of time and money for the improvement of public K-12 education are allocated to higher education under the assumption that teachers are unable to do the "mental" work of doing their own jobs. However, teachers are the closest to their own work and in the best position to improve it. Finally, I consider implications for progressive pedagogy. Progressive pedagogies claiming to promote equity for poor, working class, and even lower-middle class students will continually fall short of doing so as long as the distinction between rote and active work is maintained, even if it is disguised as judging the teacher to liberate the child.

To my heroes, Grandma and Grandpa

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Chapter 1:
Introduction

In an effort to democratize and humanize mathematical knowledge, university mathematics education research has long advocated progressive or student-centered pedagogy; or building students' agency and authority over learning math concepts. This has included drawing on students' prior mathematical and outside-of-school knowledge and interests, providing open tasks that facilitate deep conceptual understanding, and fostering collaboration between students. Through progressive pedagogy, mathematical knowledge is reconceptualized as actively constructed by the learner. These practices and ideals—which I refer to in this dissertation as "progressive pedagogy"—are held to be scientific and based in psychology.

Progressive pedagogy is contrasted to "traditional" or "rote" instruction where the teacher is the primary mathematical authority, and the major activities are receiving instructions from the teacher and practicing decontextualized skills.[1] Indeed, the very definition of popular concepts from mathematics education research such as "conceptual understanding" may be best characterized as "not rote."[2] Despite the laudatory goals and popularity of progressive pedagogy, researchers have long documented teachers' struggles in actually achieving researchers' vision.[3]

For example, in a paper from the 1990 edition of *Educational Evaluation and Policy* that has since been cited 1,690 times, David K. Cohen, Professor of Education at Michigan State University wrote about "the case of Mrs. Oublier," a second-grade teacher working in a "dusty corner of Southern California."[4] By Cohen's judgment, Mrs. Oublier was "considerate of her students, eager for them to learn, energetic, and attractive."[5] Her class was well-managed, and students and teacher "were well used to each other, and to the class routines."[6] Cohen reported that by Mrs. Oublier's own account, 4 years ago, "her mathematics teaching was thoroughly traditional." This had meant that "she followed the text," "her second graders spent most of their time on worksheets," and "learning math meant memorizing facts and procedures."[7] Mrs. O had since attended a workshop where she had learned to "engage students in actively understanding mathematics."[8]

Cohen wrote that Mrs. Oublier perceived herself to have undergone a "revolution" in her math teaching and was "delighted with her students' performance, and with her own accomplishments."[9] However, he reports that the reality of Mrs. Oublier's classroom was quite the opposite. While Mrs. O had "adopted innovative instructional materials and activities, all

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[1] Progressive pedagogy has traveled under different names in the past. For example, in the late 80s it was "constructivism." It has also been referred to simply as "reform." Here I maintain the use of progressive pedagogy for consistency's sake and to account for what is stable amongst the wide variety of different schools of progressive pedagogy.

[2] Noelle M. Crooks and Martha W. Alibali, "Defining and measuring conceptual knowledge in mathematics," *Developmental Review* 34 (2014): 344–377.

[3] See also David K. Cohen, *Teaching Practice: Plus ça change…* [Issue Paper No. 88-3] (East Lansing: National Center for Research on Teacher Education, 1988); Larry Cubin, *How Teachers Taught: Constancy and Change in American Classrooms 1890-1980*, 2nd ed. (New York: Longman, 1993); Larry Cuban, *Inside the black box of classroom practice: Change without reform in American education* (Cambridge: Harvard Education Press, 2013); Charles M. Payne, *So much reform, so little change: The persistence of failure in urban schools* (Cambridge: Harvard Education Press, 2008). For a review of historical work in this vein, see William J. Reese, "In search of American progressives and teachers," *History of Education* 42, no. 3 (2013): 320–334.

[4] David K. Cohen, "A Revolution in One Classroom: The Case of Mrs. Oublier," *Educational Evaluation and Policy Analysis* 12, no. 3 (Fall 1990): 311–329.

[5] Ibid., 311.

[6] Ibid., 321.

[7] Ibid., 311.

[8] Ibid., 311.

[9] Ibid., 311.

designed to help students make sense of mathematics," she continued to "treat new mathematical topics as though they were a part of traditional school mathematics."[10]

For example, Cohen recounted an exercise where students developed multiple ways of adding to 14 that was taught "as though the lesson were a drill, reciting in response to the teachers' queries."[11] Students were not asked to explain how they knew if an equation was true or not; right answers were accepted and wrong answers were turned down without discussion. An activity about counting in base 6 during which Mrs. Oublier repeatedly demanded that students "feel" the manipulatives was reduced to "claps and chants… with a methodical monotony."[12] Seating students in groups had been repurposed for classroom management rather than discussion. Mrs. O's students exclusively "participated on a narrow track, in which she maintained control of direction, content, and pace," and mathematics was approached as a "fixed body of right answers, rather than as a field of inquiry in which people figure out quantitative relations."[13] In short, Cohen argued that Mrs. O had incorporated activities and practices from a progressive math program seeking to develop students' understanding but had corrupted them so they served as a vehicle for mechanical, rote instruction instead.

Cohen provided this assessment of Mrs. O's class from the perspective of an education researcher who had sat amongst students and watched Mrs. O teach but did not teach children himself. He explained that Mrs. O wasn't teaching for understanding because she lacked the knowledge needed to do it. On the one hand, "she did not know mathematics deeply or extensively" despite having taken and enjoyed math courses in college.[14] Cohen speculated that, due to Mrs. O's apparent mathematical ignorance, "many misunderstandings or inventive ideas that her students might have had would have made no sense to Mrs. O, because her grip on mathematics was so modest."[15] On the other hand, Mrs. O was focusing on the wrong things pedagogically. That she and her students alike concentrated on "successfully managing a prescribed, highly structured set of activities" was getting in the way of students' mathematical sense-making.[16] Cohen explains that Mrs. O did not "see mathematics as a source of puzzles, as a terrain for argument, or as a subject in which questioning and explanation were essential to learning and knowing."[17] He lamented that "many paths to understanding were not taken in her lessons… she seemed entirely unaware of them."[18] She was focused on controlling the class, not understanding.

Cohen concluded the paper, whose pages are primarily occupied with descriptions of Mrs. O's problematic teaching and ignorance, with a plea that teachers receive more help in understanding progressive pedagogy. He noted the that the curriculum Mrs. O was using lacked an explanation of mathematics as a process of inquiry. He decried that schools of education didn't demonstrate the kind of pedagogy that they espoused. There needed to be more of an effort to "help [Mrs. Oublier] to learn more mathematics," or "to suggest and demonstrate possible changes in her instruction."[19]

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[10] Ibid., 312.
[11] Ibid., 313.
[12] Ibid., 316.
[13] Ibid., 322; 312–313.
[14] Ibid., 322.
[15] Ibid., 322.
[16] Ibid., 322.
[17] Ibid., 322.
[18] Ibid., 322.
[19] Ibid., 326.

However, the general tone of Cohen's paper seemed to suggest that the kind of "help" he is ostensibly trying to inspire would be of little help. His paper had begun by announcing the intractability of implementing reform which had frustrated reformers for over a century. He provided citations on enduring teacher resistance to progressive pedagogy and noted that Mrs. O was truly an exception in her efforts to try it out. Moreover, despite her exceptional enthusiasm (and "attractive"-ness), Mrs. O is portrayed as exceptionally dull in ways that suggest that she would be impervious to researchers' best efforts. This condescension is implicit in the multitude of references to "her revolution," despite the fact that she is never quoted as actually referring to her pedagogical changes as a "revolution." The condescension is explicit in the multitude of references to Mrs. O's lack of knowledge pertaining to her work.[20] Mrs. O seemed "completely oblivious" about problems with her teaching that sent the apparently more perceptive, insightful and intelligent Cohen "reeling mentally."[21] Her "relative ignorance" is cited as making it "difficult to learn from her "very serious *efforts* to teach for understanding" and to "imagine[] many different ways in which she might teach mathematics."[22] In this way, Cohen's portrayal of students' learning as rote is wrapped up in the presentation of Mrs. Oublier as an unimaginative, mechanical, and indeed rote worker herself.

Cohen's judgements, in contrast to Mrs. Oublier's and by nature of coming from a university professor of education, are presented as the objective reality of Mrs. O's classroom. However, there is no mention of Cohen inviting Mrs. O to observe his own second-grade classroom or offering to do a demonstration in hers. Cohen is thus impressively immune to the kind of criticism that he is leveling at Mrs. Oublier. As Cohen himself notes, "it is one thing to embrace a doctrine of instruction, and quite another to weave it into one's practice."[23] It is hard to understand what methodology backed Cohen's judgements sufficiently to warrant publication in the journal of the *American Educational Research Association.* His major approach appears to be spending "time in the field," and surely Mrs. O had more of that than Cohen by nature of her daily work as a teacher.

Rather than protecting Mrs. Oublier as a research subject, her anonymity (behind the French word for "to forget") portrays the category of elementary school teachers more broadly as incompetent. Indeed, "The Case of Mrs. Oublier", as the paper is aptly subtitled, is particular but in ways that are intended to speak to a broader set of phenomena (of teachers). Furthermore, as Cohen explains, the vast majority of teachers were busy resisting reforms, and therefore presumably teaching by rote. "The Case of Mrs. Oublier," demonstrates that even the cream of the elementary school teacher crop was inevitably pulled—despite her best efforts yet because of her own failings—into rote instruction.

While Cohen's portrayal of "Mrs. Oublier" is distinctly sexist, portrayals of teachers as inevitably rote in the form of research papers have not limited themselves to female or even elementary school teachers. Two years earlier, in the 1988 edition of *Educational Psychologist,* Alan Schoenfeld, an education professor at the University of California, Berkeley, recounted the

[20] Ibid., 314. Interestingly, the first person credited in Cohen's paper as having announced a pedagogical "revolution" is John Dewey on page 312. After that, Mrs. Oublier's pedagogical changes are referred to as "her revolution."
[21] Ibid., 321, 323.
[22] Ibid., 323. Emphasis added. In a gendered reading, that Mrs. O put in "serious effort" is not an indicator of intelligence, but rather an indicator of a lack thereof.
[23] Ibid., 314.

results of another "case study in mathematics instruction."[24] The teacher of interest for this paper was teaching 10th grade geometry and was indicated as male.

Again, from the perspective of teachers and administrators, the "class was well managed" and even "well taught," with students doing well on standardized exams. Students spent most of the class working on problems, some presented solutions at the board, and questions were encouraged. The teacher felt that they were teaching for understanding and had given researchers an "open invitation…to visit any of his classes, any time, without prior notice."[25] However, from "a mathematician's point of view"—backed with a literature review on mathematical cognition and teaching—the class "was an important and illustrative failure" or "Disaster" which "may have done the students as much harm as good." In a sentiment echoed by Cohen, "the students developed perspectives regarding the nature of mathematics that were not only inaccurate, but were likely to impede their acquisition and use of other mathematical knowledge."[26]

Schoenfeld goes on to explain that the teacher treated geometrical construction as "the mastery of a physical rather than an intellectual skill."[27] The emphasis was on effective and efficient use of a compass and straightedge "as a step-by-step procedure to be memorized."[28] Students were taught to "rely exclusively on empirical standards to judge the correctness of their work" as opposed to relying on "understanding."[29] Lessons on two-column proofs emphasized the "form of the expression" over "the substance of the mathematics."[30] Students were learning to "view themselves as passive consumers of others' mathematics," namely that of the teacher and the textbook.[31]

Rather than being particular to this teacher, Schoenfeld's broader study of Grade 9 through 12 math classes in New York "showed little variation in substance from class to class."[32] Unfortunately, "none of the students in any of the dozen classes we observed worked mathematical tasks that could seriously be called problems." Teachers in New York were overly concerned about the impending Regents exam and were teaching to the test. Across New York, teachers were focused on the "mastery of relatively small chunks of subject matter" and trained students toward "error-free and mechanical performance."[33] Citing an NAEP report, Schoenfeld explains that even though students' scores in mathematics had improved in recent years, this did not necessarily reveal actual improvement, because many of the problems "can be mechanically solved by applying a routine computational algorithm."[34]

In contrast to teachers, research and researchers were posited as the solution. So far they had established "what mathematical thinking is not: the rote memorization of facts and procedures as often practiced in our classrooms, and as reified by current tests and examinations."[35] More information was needed; namely, "detailed elaborations of the nature of mathematical thinking" and the related "knowledge and cognitive processes that comprise thinking mathematically." This work was "in the early stages" but required "grounding in both mathematics and

[24] Alan H. Schoenfeld, "When Good Teaching Leads to Bad Results: The Disasters of "Well-Taught" Mathematics Courses, *Educational Psychologist* 23, no. 2 (1988): 145–166.
[25] Ibid., 151–152.
[26] Ibid., 145.
[27] Ibid., 154.
[28] Ibid., 154.
[29] Ibid., 155–156.
[30] Ibid., 158.
[31] Ibid., 160.
[32] Ibid., 162.
[33] Ibid., 159, 161.
[34] Ibid., 162.
[35] Ibid., 164.

psychology, and thus the collaboration of mathematicians and cognitive scientists."[36] The role of teachers is unmentioned.

In recent years, mathematics education researchers have taken a more empathetic view toward teachers, emphasizing that akin to students, teachers also need to be active learners within professional development efforts. This vein of thinking has posited a role for education researchers as facilitative teacher-educators rather than as explaining what teachers are doing wrong. Newer studies document processes of "teacher learning," "teacher professional learning," "lesson study" and building "teacher agency" toward the implementation of reform ideals.[37] This reconceptualization is often envisioned as professionalizing teachers in contrast to a longer trajectory of deprofessionalizing testing regimes and prescriptive curricula.

And yet, these efforts, rather than reconceiving the relationship between teachers and researchers, have continued to lean on the idea that non-teaching experts are needed to intervene on rote teachers. Researchers advocate that teachers should have more capacity to participate in decision making in as much as this process is facilitated (controlled) by education researchers and geared toward education researchers' goals. In a relatively representative wording, Mark Priestly, Gert Biesta and Sarah Robinson explain that "the (re)turn to teacher agency not only gives explicit *permission* to teachers to exert higher degrees of professional judgement and discretion within the contexts in which they work but also sees their agency as a key dimension of teachers' professionalism."[38] They go on to explain that their approach is not about teacher autonomy, which they see as "moving towards a different extreme."[39]

In this dissertation I argue that, rather than being an anomaly, the relationship between teachers and experts as elucidated in Cohen's paper on "Mrs. Oublier" is at the core of progressive pedagogy itself. As I explain, progressive pedagogy has been a tradition of non-teaching education experts in the United States for over 180 years. Throughout, progressive pedagogy has served as a means of portraying teachers as inevitably rote workers by nature of doing the day-to-day work of teaching but also by their own discretion. Meanwhile, progressive pedagogy has portrayed non-teaching pedagogical experts in higher education as active, agentic, authoritative, mental and in general non-rote in their quest to improve teaching through writing.

Despite what pedagogical experts have continually stated about teachers, teachers widely view themselves as engaging in progressive practices and, indeed, *are.* Teaching is an incredibly challenging job—which is why many people don't do it for long or don't do it at all—and involves securing students' consent to being taught on a daily basis. A functioning classroom alone indicates that teachers have found ways to draw on students' interests and know something about "the child." Indeed, pedagogical experts of the early 1800s, such as David Perkins Page,

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[36] Ibid., 164.

[37] For literature reviews of teacher learning studies see Hilda Borko, "Professional development and teacher learning: mapping the terrain, *Educational Researcher* 33, no. 8 (2004): 3–15; Laura M. Desimone, "Improving Impact Studies of Teachers' Professional Development: Toward Better Conceptualizations and Measures," *Educational Researcher* 38, no. 3 (April 1, 2009): 181–189; Thomas Guskey, "Professional development and teacher change," *Teachers and Teaching* 8, no. 3 (2002): 381–391. For a review of literature on teacher professional learning between 1960 and 2018, see Phillip Hallinger & Dhirapat Kulophas, "The evolving knowledge base on leadership and teacher professional learning: a bibliometric analysis of the literature, 1960-2018," *Professional Development in Education* 46, no. 4 (2020): 521–540. For mathematics education-specific examples see Lynn T. Goldsmith, Helen M. Doerr & Catherine C. Lewis, "Mathematics teachers' learning: a conceptual framework and synthesis of research. *Journal of mathematics teacher education* 17, no. 1 (2014): 5–36; Elham Kazemi and Megan Loef Franke, "Teacher learning in mathematics: using students work to promote collective inquiry," *Journal of Mathematics Teacher Education* 7, no. 3 (2004): 203–235.

[38] Mark Priestley, Gert Biesta and Sarah Robinson, *Teacher Agency: An Ecological Approach* (London: Bloomsbury Academic, 2015), 2. Emphasis added.

[39] Ibid., 4.

claimed that their progressive ideals were the product of their own teaching experience. In the face of pedagogical experts' use of progressive pedagogy as an ideal that teachers can never achieve in practice and that can only be achieved by experts in writing, the fact that many teachers identify as progressive teachers is a testament to the ways in which progressive pedagogy speaks to their actual experiences of teaching.

Rather than examining the internal consistency of progressive pedagogy as a philosophy or its viability in practice, this is an examination of progressive pedagogy in terms of its *occupational* functions. In this I draw from scholars who have posited a relationship between the professionalization of teacher education institutions and the deprofessionalization of teachers. In order to draw connections across higher education institutions, I examine progressive pedagogy in publications related to normal schools, schools of education and professors in the university disciplines. Prior to the development of schools of education, progressive pedagogy was promoted and developed in normal schools—the first state-funded institutions for teacher training—which have since evolved into state university systems. Additionally, university disciplines flirted with expertise in pedagogy in their respective subjects as a part of the university's rapid expansion and shift from a religious to a secular, scientific orientation in the last quarter of the 1800s and early 1900s.

This dissertation takes the publications of these various pedagogical experts as its object, considering the ways in which experts' articulation of progressive pedagogical theory simultaneously articulated relationships between teachers and non-teaching pedagogical experts. I relate this process to the shifting institutional relations and work conditions of both groups. The next section provides a literature review on representations of teachers' work, from concerns about whether teachers are professionals or not, to the analysis of deskilling in the labor process, to the understanding that skill is socially constructed.

Methodological and Theoretical Influences: From Professionalism to the Construction of Skill

Progressive pedagogy is not only the content of research on pedagogy, but also the abstract knowledge base for teacher education programs. Indeed, professionalizing teaching through constructivist teacher education has been a perennial interest of teacher training institutions and policy makers since the first state-funded normal schools were founded. And yet, teaching continues to have a troubled relation to professional status; in the United States the belief that teachers are indeed professionals has long coexisted with movements to professionalize the (presumably not professional) teaching force.

From the point of view of "trait theory," occupations are considered professions in as much as they share traits with archetypical professions: doctors, lawyers and university professors. In this way, occupations are professions because they set their own standards for admission, require advanced education in an abstract knowledge base, elect leaders for leadership positions from their own ranks, and have exclusive associations for members of their occupation. A key trait is that professions enjoy considerable autonomy in their work, free of government and managerial control. Professions also enjoy substantially better than average salaries, work conditions and prestige.[40] Some of this prestige and autonomy is based on professions' codes of ethics and the idea that they render services to the public.

[40] Different sociologists emphasize different traits as more core. For example, Andrew Abbott, *The System of Professions: An Essay on the Division of Expert Labor* (Chicago: The University of Chicago Press, 1988) emphasizes the esoteric or abstract

Based on trait theory and akin to other "feminized" occupations like nursing and social work, teaching is generally considered a "semi-profession."[41] On the one hand, curriculum, the conditions of and entrance into teaching are generally controlled by governments and administrators rather than teachers. Teachers rarely have any formal input on policies that affect their work except in the narrow scope of what can be legally bargained by local unions and districts or lobbied for by the American Federation of Teachers or National Education Association. On the other hand, teachers often enjoy a high degree of autonomy within their own classrooms.[42] While master's degrees in teaching are available for those who didn't earn a credential during their undergraduate education, these are generally not required, and many entered teaching through an emergency credential until the early 2000s.[43] Despite the endurance of progressive pedagogy as an abstract knowledge base with broad appeal, progressive pedagogy and schools of education more generally have undergone continual assaults to their academic legitimacy.[44] Teachers sometimes enjoy high esteem at the local level for providing a valued service to the community, but rarely in terms of being professionals, as demonstrated by the popularity of statements like "those who can't do, teach," suggesting a generalized lack of competence amongst teachers.[45]

Teacher organizations also exhibit professional and not-professional traits. Content-teaching organizations have generally included educational experts and are thus not exclusive to teaching, but teachers' unions have taken up the dual helm of unionization and professionalism. The American Federation of Teachers, for example, asserts itself as a "union of professionals." And yet, teachers have had to advocate for their working conditions, salaries and benefits extensively through unionization, pointing to an absence of professional-level compensation. As C. Wright Mills declared, teachers are the "economic proletarians of the professions."[46] Teacher unionism has also been seen as indicating that teachers are too focused on "extrinsic" financial motivation to be truly "intrinsically" and selflessly motivated by their work.[47]

Teacher training institutions have generally made the claim that advanced training and increased exposure to progressive pedagogy or the "science of pedagogy" is the key to a professional teaching force. The expansion of master's programs offering teacher training is at least in part evidence of the success of this argument. And yet, scholars have argued that science-

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knowledge base, whereas Eliot Friedson, *Profession of Medicine: A Study of the Sociology of Applied Knowledge* (Chicago: The University of Chicago Press, 1970) emphasizes autonomy.

[41] Amitai Etzioni (Ed.), *The Semi-Professions and Their Organization: Teachers, nurses and social workers* (New York: The Free Press, 1969).

[42] Dan C. Lortie, "The balance of control and autonomy in elementary school teaching," in *The semi-professions and their organization,* ed. Amitai Etzioni (New York: Free Press, 1969), 1–53; John Meyer & Brian Rowan, "The structure of educational organizations," in *Environment and organizations*, ed. Marshall W. Meyer (San Francisco: Jossey-Bass, 1978), 78–å109.

[43] This option ended with the passage of No Child Left Behind in 2003. Specific employers may still apply for Short-Term Staff Permits and Provisional Internship Permits to fill "acute staffing needs," but short-term hires are limited to one year. For a discussion see California Commission on Teacher Credentialing, *Teacher Supply in California 2018-2019 submitted pursuant to AB471 chap 381, stats. 1999* (Sacramento, Commission on Teacher Credentialing, 2020): 17–18.

[44] For a few examples see David Hirsch, *The Schools We Need And Why We Don't Have Them* (New York: Anchor Books, 1996)*;* James Koerner, *The Miseducation of American Teachers* (Boston: Houghton Mifflin, 1963); Rita Kramer, *Ed School Follies: The Miseducation of America's Teachers* (New York: Free Press, 1991)*;* Thomas Sowell, *Inside American Education: The Decline, the Deception, the Dogmas* (New York: Free Press, 1993).

[45] For a lengthier assessment of teaching in relation to professional traits see Richard M. Ingersoll and David Perda, "The Status of Teaching as a Profession," in Jeanne H. Ballantine and Joan Z. Spade, *Schools and Society: A Sociological Approach to Education 3rd Edition* (Los Angeles: Pine Forge Press, 2008), 106–118.

[46] C. W. Mills, *White collar* (New York: Oxford University Press, 1951), cited in Ingersoll and Perda, "The Status of Teaching as a Profession," 114.

[47] On this point see Nina Bascia, "Teachers as Professionals: Salaries, Benefits and Unions," in *International Handbook of Research on Teachers and Teaching,* eds. Lawrence J. Saha and Anthony Gary Dworkin (New York: Springer, 2009), 481–489.

backed efforts toward teacher professionalism have often emanated from administrators and pedagogical experts rather than from teachers themselves. Indeed, these efforts have generally professionalized administrators and pedagogical experts rather than teachers, and even undermined teacher professionalism by subjecting teachers to increasing management.[48] This suggests the importance of analyzing teaching as a profession (or non-profession) in relation to pedagogical experts who are removed from teaching. As Geraldine Clifford and James Guthrie note, "graduate professional education prepares, socializes, and certifies the vast majority of the new recruits to a leadership of the education profession by those who have abandoned teaching."[49]

Accordingly, teachers and teachers' unions have at times resisted top-down visions of professionalism. For example, Marjorie Murphy documents the Chicago Teachers' Federation's early 1900s resistance to professionalizing efforts as a means of retaining their community orientation and preserving their work conditions.[50] In a more recent context, Andrew Gitlin and Frank Margonis describe teachers' "good sense" resistance to pedagogical reforms that were sexist and classist in implementation.[51] However, rather than having the capacity to aggressively push for professional control, teachers have generally had to focus on work conditions such as class sizes and breaks, earning a living wage and benefits, and self-defense against the most harmful policies.

Pedagogical experts themselves have noted the invisibilization of teacher voice and experience in pedagogical expertise and attempted to include teachers and teaching in the scientific process through "action research," "teacher research" and initiating writing projects for teachers.[52] And yet, these efforts have been marginal to the mainstay of pedagogical expertise and have had little broad-scale effect on teacher-expert relations or teacher professionalization. Additionally, full-time teachers rarely have time to participate in these types of "professional" projects on their own and thus they are typically done by academics teaching part-time and short-term. Research methods that are acceptable to academics may have little utility or efficiency for full-time teachers in their own practice.

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[48] Kathleen Anne Cruikshank, "The rise and fall of American Herbartianism: Dynamics of an educational reform movement," (PhD diss., University of Wisconsin Madison, 1993); Andrew Gitlin, "Gender and Professionalization: An Institutional Analysis of Teacher Education and Unionism at the Turn of the Twentieth Century," *Teachers College Record* 97, no. 4, (Summer 1996): 588–624; Jurgen Herbst, *And Sadly Teach: Teacher Education and Professionalization in American Culture* (Madison: The University of Wisconsin Press, 1989); David F. Labaree, "Power, Knowledge, and the Rationalization of Teaching: A Genealogy of the Movement to Professionalize Teaching," *Harvard Educational Review* 62, no. 2 (Summer 1992): 123–154; Arthur G. Powell, *The Uncertain Profession: Harvard and the Search for Educational Authority* (Cambridge: Harvard University Press, 1980); James W. Stigler & James Hiebert, *The Teaching Gap: Best Ideas from the World's Teachers for Improving Education in the Classroom* (New York: Free Press, 1999).

[49] Geraldine Jonçich Clifford and James W. Guthrie, *Ed School: A Brief for Professional Education* (Chicago: The University of Chicago Press, 1988), 14.

[50] For unions' resistance, see Gitlin, "Gender and Professionalization" and Marjorie Murphy, *Blackboard Unions: The AFT and the NEA, 1900-1980* (Ithaca: Cornell University Press, 1990).

[51] For individual teachers' "good sense" resistance to reforms see Andrew Gitlin and Frank Margonis, "The Political Aspect of Reform: Teacher Resistance as Good Sense," *American Journal of Education* 103, no. 4 (August, 1995): 377–405.

[52] For an argument for teacher research, see Marilyn Cochran-Smith and Susan L. Lytle, "Research on Teaching and Teacher Research: The Issues that Divide," *Educational Researcher* 19, no. 2 (1990): 2–11. For examples of action research see Patricia J. Bonner, "Transformation of Teacher Attitude and Approach to Math Instruction through Collaborative Action Research, *Teacher Education Quarterly* 33, no. 3 (2006): 27–44; Clarence L. Terry, "Prisons, Pipelines, and the President: Developing Critical Math Literacy through Participatory Action Research," *Journal of African American Males in Education* 1, no. 2 (2010): 73–104.

Patriarchy has been a major barrier to teacher professionalism in that teachers are often female whereas administrators and pedagogical experts have tended to be male.[53] Even as teaching has historically provided a means of social and economic mobility for females, allowing them greater self-determination, these gains have depended on women's' traditional roles as caretakers and traditional gender relationships of women working under men's control.[54] Scholars have argued that top-down professionalizing projects have reinforced gender inequalities between experts, administrators and teachers.[55]

Scholars leaning on a Marxist mode of analysis have considered the evasions of "professionalization" and "professionalism" for teachers, arguing that appeals to professionalism have facilitated teachers' proletarianization by increasing teachers' consent to controls on their work and increased work volume.[56] Kathleen Densmore suggests the importance of examining teaching in relation to other occupations when she explains that, for teachers, "the definition of 'professional expertise' reflects a situation in which they have already been excluded from the potential for full exercise or development of content knowledge and related teaching skills."[57]

As an alternative to investigating teachers' situation under the rubric of "professionalism," which had been revealed as particularly ideological and not incredibly informative, in the 1980s scholars (including Densmore) began analyzing teachers' work through the lens of Harry Braverman's *Labor and Monopoly Capitalism* ("labor process theory"). Scholars asked whether and how teachers were being "deskilled."[58] Deskilling is a process by which employers extract the conception of work (the "mental") from workers' execution of it (the "manual") through managerial strategies and technology. For Braverman, the extraction of knowledge of the labor process from workers, or "the separation of the head and the hand," is key to the exploitation of labor. Scholars deploying labor process theory in the 80s generally found that teachers were indeed being deskilled to some extent, for example through pre-packaged curricula and the imposition of standardized exams, even if these processes were being contested. However, these analyses have leaned heavily on class to the exclusion of other social and political relations.

Feminist sociologists and anthropologists revealed in the late 80s that what is even perceived as skill or a lack thereof is socially constructed in ways that are influenced by and, in turn, inform, race, gender and class relations.[59] For example, Joan Acker explains that certain

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[53] Myra H. Strober and David Tyack, "Why Do Women Teach and Men Manage? A Report on Research on Schools," *Signs* 5, no. 3 (Spring, 1980): 494–502; Kathleen Weiler, *Women Teaching for Change: Gender Class and Power* (New York: Bergin & Garvey Publishers, 1988).

[54] Michael W. Sedlack, "Let us go and buy us a schoolmaster," in *American Teachers: Histories of a profession at work*, ed. Donald Warren (New York: Macmillan, 1989), 257–290.

[55] Gitlin, "Gender and Professionalization"; Murphy, *Blackboard Unions*.

[56] Kathleen Densmore, "Professionalism, Proletarianization and Teacher Work," in *Critical Studies in Teacher Education,* ed. Thomas S. Popkewitz (New York: The Falmer Press, 1987), 130–160. Marjorie Murphy gives the example of the Chicago Teachers' Federation apprehending these appeals to professionalism. Marjorie Murphy, *Blackboard Unions.*

[57] Ibid., 153–154.

[58] Harry Braverman, *Labor and Monopoly Capital* (New York: Monthly Review Press, 1974). For a review of the broader "labor process debate" see David A. Spencer, "Braverman and the Contribution of Labour Process Analysis to the Critique of Capitalist Production – Twenty-Five Years On," *Work, Employment & Society* 14, no. 2 (2000): 223–243. For scholarship considering the labor process of teaching see Michael W. Apple, *Education and Power* (Boston: Routledge & Kegan Paul, 1982); Michael W. Apple, *Teachers and Texts: A Political Economy of Class and Gender Relations in Education* (New York: Routledge & Kegan Paul, 1987); Densmore, "Professionalism, Proletarianization and Teacher Work." For reviews see Jenny Ozga and Martin Lawn, "Schoolwork: Interpreting the Labour Process of Teaching," *British Journal of Sociology of Education* 9, no. 3 (1988): 323–336 and Alan Reid, "Understanding Teachers' Work: is there still a place for labour process theory?" *British Journal of Sociology of Education* 24, no. 5 (November 2003): 559–573.

[59] See for example Joan Acker, *Doing Comparable Worth: Gender, Class and Pay Equity* (Philadelphia: Temple University Press, 1989); Veronica Beechy, "Rethinking the definition of work," in J. Jenson, E. Hagen, and C. Reddy (eds.), *Feminization of*

"invisible" skills (for example, being able to manage a classroom) are taken as natural to women or as something that anyone can do with basic education. In contrast, "actual" skills are constructed as requiring training and are primarily possessed by men. The visibility and invisibility of skills is continually reproduced and reconstructed, reflecting the power and privilege of those assessing skills in relation to those who do or don't have them. Vice versa, occupational relations are maintained through the continual prioritization of some skills and the invisibilization of others.[60] Rather than being exclusively constructed along lines of gender, Acker notes the imbrication of gender and occupational or class relations in the construction of skill such that they are not the same but also prop each other up. [61]

Scholars of education have taken up lenses of class, gender and disability as a means of analyzing perceptions of teachers' skill more specifically.[62] However, these analyses have tended to focus on relations between teachers and public policy or school and district administrators rather than the relation between teachers and teacher education or teachers and progressive pedagogy. As an exception, feminist education theorists Frances Maher and Valerie Walkerdine have focused specifically on the role of pedagogical experts and progressive pedagogy, arguing that progressive pedagogy communicates a gendered imagery of the teacher, pedagogical expert and child. Even as progressive pedagogy embraces traditionally female values like relationality and facilitating growth, it constructs the student and expert as agentic males in relation to a the supposedly passive female teacher.[63] And yet, particularly given the increasing gender diversity of both teachers and pedagogical experts and the fact that high school teaching has always included a high proportion of men, this continuing dichotomy cannot be reduced exclusively to gender relations. This dissertation draws on the insight of feminist theorists about how progressive pedagogy has constructed a passive teacher in relation to the active student and expert but focuses centrally on the ways in which progressive pedagogy is used to portray images of varying forms of labor in ways that invoke gender but also more general visions of work.

In this dissertation, I analyze how experts *portray* teachers' labor through the vehicle of authoritative texts about progressive pedagogy. Indeed, the stability of progressive pedagogy in articulating relations between teachers and experts has been achieved through constant textual reproduction and reconstruction as well. While the use of authoritative texts is a convenient

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the Labour Force (Cambridge: Polity Press, 1988), 45–62; Judy Wajcman, "Patriarchy, Technology, and Conceptions of Skill," *Work and Occupations* 18, no. 1 (1991): 29–45.

[60] Ulrich Rauch, "The Social Construction of Skill: Skill and Working Knowledge of Garment Workers in a Vancouver Clothing Factory," (PhD diss., University of British Columbia, 1996).

[61] For a discussion, see Acker, *Doing Comparable Worth,* 213–214.

[62] Apple, *Teachers and Texts* revises his previous work on the deskilling of teachers to include the role of gender in shaping perceptions of teachers and texts in making prescriptions for what the nature of teachers' work should be. Kate Rousmaniere argues, drawing from the lens of disability, that teachers have long been viewed as inadequate or subnormal, and that teaching has been furthermore viewed as *making* educators weak and subnormal, for example through "teacher burnout". Kate Rousmaniere, "Those Who Can't, Teach: The Disabling History of American Educators," *History of Education Quarterly* 53, no. 1 (February 2013): 90–103. See also Kristen Chmielewski, ""Hopelessly insane, some almost maniacs": New York city's war on "unfit" teachers," *Paedagogica Historica* 54, nos. 1-2 (2018): 169–183.

[63] Frances Maher, "John Dewey, Progressive Education, and Feminist Pedagogies: Issues in Gender and Authority," in *Feminist Engagements: Reading, Resisting, and Revisioning Male Theorists in Education and Cultural Studies*, ed. Kathleen Weiler (New York: Routledge, 2001), 13–32; Valerie Walkerdine, "Femininity as Performance," *Oxford Review of Education* 15, no. 3 (1989): 267–279. In a similar but less gender-specific vein, Thomas Popkewitz argues that progressive education research "divides the researcher" from students and teachers who are governed by curricular goals for their souls. Thomas S. Popkewitz, "The Alchemy of the Mathematics Curriculum: Inscriptions and the Fabrication of the Child," *American Educational Research Journal* 41, no. 1 (Spring 2004): 3–34; Thomas S. Popkewitz, "Curriculum study, curriculum history, and curriculum theory: the reason of reason," *Journal of Curriculum Studies* 41, no. 3 (2009): 301–319.

source for historical work, it is also a great source because of the purpose it served pedagogical experts in not only making removed commentary on teaching, but also in abstracting notions of pedagogy from teachers' work as a form of decontextualized expertise.

As a starting point, I draw on histories of progressive education ranging between 1830 and 1910 as well as biographies of famous progressive pedagogical experts such as John Dewey. These histories provided hints for books and articles by pedagogical experts that I needed to read as primary sources. I was very fortunate in that these documents are first, made public through publishing avenues by nature of being written by experts, and second that many are freely available online through resources such as Internet Archive, Hathitrust and GoogleBooks because their copyrights have expired. In analyzing how experts portrayed teachers' labor, I also attempted to contextualize these portrayals in the changing forms of work that both experts and teachers were engaged in at evolving institutions.

By portraying teachers' work as "rote" or manual by nature of being actual teachers, pedagogical experts were also able to portray their own work as "active" mental activity, or actual knowing about teaching. Rote work in this case is less about whether work is affirmatively manual, and more about whether it is perceived as lacking productive mental qualities like creativity and self-determination. Whether or not it corresponded to the realities of teachers' labor process, pedagogical experts enacted a discursive "deskilling" on the teaching occupation. This was in the interest of claiming the "mental" aspects of teachers work—namely, knowing about teaching—as their own academic terrain.

In my view that experts' descriptions of teachers' work operate in relation to their construction of their own work, I draw to some extent from Andrew Abbott, who argued that professions (or in a broader view, occupations more generally) co-exist in a "system" in which they compete for "relatively abstract" intellectual turf.[64] Abstract intellectual turf both delineates a "jurisdiction" of work tasks and serves as a justification for a particular group carrying out those tasks. As I shall argue, progressive pedagogy is an assertion of abstract intellectual turf by pedagogical experts on the basis that teachers are incapable of managing their own intellectual turf due to their propensity for being "rote" workers.

Magali Sarfatti Larson theorizes professionals as embodied producers of knowledge, where the state of being an embodied producer is achieved through advanced education. This dissertation suggests that embodied producers are constructed in relation to *embodied non-producers.* The case of relations between teachers and pedagogical experts is unique in that the embodied producers and non-producers work in close proximity to each other; pedagogical experts provide the training for teachers.

However, the relationship between teachers and pedagogical experts is also reflective of class relations more broadly in that the relation between those who do "rote" work versus those who do "mental" work is reproduced and legitimated by the university. Calls for teacher professionalism paired with the accusation that teachers are rote became popular amidst a broader movement for professional and manual training in the United States and Europe concomitant with industrialization. Indeed, schools of education not only served to "professionalize" teachers but envisioned a professional and manual training for students alike. Progressive pedagogy served both projects. Thus, I also relate the ways that pedagogical experts invoke teachers to their theorizing on the appropriate occupational training for children.

The dissertation starts in the 1820s, as teacher educators began producing normal school textbooks depicting a "science of pedagogy." While these textbooks were relatively practice-

[64] Abbott, *The System of Professions.*

oriented and cited these nascent experts' classroom experience as the basis for what was written, they complained at length about the deficiencies of the teaching force and explained that teachers should give students more agency over their learning and avoid instruction by rote. State-funded normal schools rapidly expanded in the following three decades in order to provide teachers for the common schools. Amidst the feminization of teaching, normal schools imported European philosophies, and I focus on the role of Pestalozzianism and Herbartianism in providing not only constructivist ideals for teaching but an empathetic yet scientific persona for the pedagogical expert in contrast to that of the "rote" teacher.

The science of pedagogy made its way to the university by the late 1800s, where new schools of education would claim a progressive pedagogy that was both more scientific and more student-centered than that promoted by the normal schools, even as they extricated themselves further from anything having to do with teaching children. As a part of developing new research universities where professors could focus on creative work, professors across disciplines fought to spend less time teaching and doing other "rote" tasks, even as they provided constructivist pedagogical recommendations for the common and high schools. Here, I focus on the case of mathematics.

Practical Arithmetic

More than any other subject, math is continually envisioned as rote due to its excessive abstraction, but also as having impressive potential for students to discover it because this same abstraction gives it a sense of being true of the concrete world. Indeed, arithmetic only became a popular school subject *when* it was staked out as a subject area needing pedagogical reform; teachers' "rote" efforts with arithmetic were robbing students of an opportunity for true discovery. In this section, I provide a sketch of Warren Colburn's constructivist interventions into arithmetic as an entry into the advantages of the case of math and some of the subthemes I explore in the dissertation, namely "practical" knowledge and "foundations."

Walter Scott Monroe describes that, in the colonial United States, "arithmetic was looked upon as "common," "vile," and "mechanic"" among "the nobility and the aristocracy of the educated." This was because arithmetic (and mathematics more generally) was primarily used in the context of work by clerks, artisans, tradesmen, and "others who bore no signs of heraldry."[65] Based on its condemning utility for particular jobs, arithmetic was not considered an appropriate part of a liberal arts education. Boys entering commerce or the trades would often need to attend a specific writing or reckoning school to study arithmetic as it was either not offered in common schools or treated only as the final exiting challenge that the common school could offer. Even as arithmetic was accepted into the college curriculum, it was out of a need to calculate rather than due to the value of the mental training offered by mathematics. In 1760 when Princeton began to require arithmetic as an entrance requirement, they explained that students needed "to understand the principal rules of vulgar arithmetic."[66]

Despite its reputation as an eminently practical subject, learning arithmetic was first and foremost learning the "rules" of arithmetic rather than applying them to practical situations or, indeed, applying them at all. Hardly any practice problems that would help students practice the application of arithmetic rules were provided in textbooks, and teachers were unlikely to even

[65] Walter Scott Monroe, "Development of Arithmetic as a School Subject," *Department of the Interior, Bureau of Education Bulletin*, no. 10 (Washington: Government Printing Office, 1917), 5.
[66] Ibid., 13.

assign all of those few. Arithmetic was solely a written exercise and thus generally referred to as "cyphering."[67]

Textile magnate Warren Colburn's arithmetic textbook, first published in 1821, has been heralded as earning arithmetic a place in the official U.S. curriculum through its widespread popularity.[68] Colburn's *Intellectual Arithmetic* was one of the first attempts at employing Pestalozzi's strategies in the United States, although he had not had the chance to read the texts or witness the pedagogy of the famed Swiss educationist first-hand.[69] Signaling a shift from the perception of arithmetic as "mechanic" and "vulgar" through its title, Colburn emphasized students' agency in constructing arithmetic knowledge. Ironically, the purported roteness of arithmetic aided its popularity as a now-universally valuable school subject, not only because it provided students and teachers finite problems to solve during school hours which were clearly right or wrong, but also because it had an impressive potential for being fixed through progressive interventions.

For the ensuing Pestalozzian inductive arithmetic movement, "intellectual" arithmetic meant oral instruction as opposed to manual cyphering, which was too much like rote "manual" work. Despite rallying against manual work, Colburn would draw practice with objects into his pedagogical reform. Colburn was concerned about the fact that many students entered school able to count, but few of them had a strong "intellectual" understanding of what counting means. As Colburn explains, "the difficulty is they have been taught to repeat the numerical names, one, two, three, in order, without attaching ideas to them." To deal with this, the teacher must "lead the child to apprehend the meaning of each numerical word by using it in connection with objects." [70] Familiar objects served as "counters;" for example beans, fingers, stones or peas. Colburn held that students gained a concept of number "by observing sensible objects." From there, the student would gradually, by drawing inferences (or inducting) from observation, "obtain an abstract idea of number."[71]

Once students gained an abstract idea of number, they would also use familiar objects as a means of working out solutions to the basic operations, and Pestalozzian unit and fraction tables were used to help children visualize what fractions looked like. Whereas arithmetic had originally been a means of solving applied problems in the context of a trade, for Colburn and his followers, "practical" was understood to mean problems that were decontextualized but drew on students' "sense-perceptions" through the use of familiar objects and situations that would be

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[67] Ibid., 14-16.

[68] Colburn wrote this textbook while teaching for a two and half years in Boston after graduating from Harvard. He then became the Superintendent at a textile manufacturing company called Lowell Merrimack Manufacturing. He continued his interest in education by participating in the American Institute of Instruction.

[69] Warren Colburn, *Colburn's First Lessons: Intellectual Arithmetic, Upon the Inductive Method of Instruction* (Boston: William J. Reynolds & Co., 1849 (1827)). See also Warren Colburn, *First Lessons in Arithmetic on the Plan of Pestalozzi with Some Improvements* (Boston: Cummings, Hilliard, & co., 1823), ix. For further discussion on Colburn's early concern about the school math curriculum, see Jeremy Kilpatrick, "Warren Colburn and the inductions of reason," in "*Dig where you stand" 3: Proceedings of the Third International Conference on the History of Mathematics Education September 25-28, 2013, at Department of Education, Uppsala University, Sweden*, eds. Kristín Bjarnadóttir, Fulvia Furinghetti, Johan Prytz and Gert Schubring (Uppsala University, 2013), 219–231 and David Lindsay Roberts, *American Mathematicians as Educators, 1893-1923* (Boston: Docent Press, 1997), 12 and 94. In her account of the Oswego Normal School, Dorothy Rogers claims that Colburn originally tried to pass off Pestalozzianism as his own invention. See Dorothy Rogers, *Oswego: Fountainhead of Teacher Education, A Century in the Sheldon Tradition* (New York: Appleton-Century-Crofts, Inc., 1961).

[70] Ibid., ix.

[71] Ibid., iv.

relatively familiar to the student.[72] Well-chosen problems done with familiar physical objects, or "questions of a practical kind," would "show at once what the combination is, and what is to be effected by it." Once the use of counters had been demonstrated to students, Colburn describes that the student

> will naturally resort to them at his seat, using beans or marks on his slate for this purpose. It will be far better for him to come to the use of counters in the natural way, than to be enjoined to use them before he has been interested in witnessing their application."[73]

Through interaction with the concrete and even naturalistic particulars of the counters, and without over-direction from the teacher, students would "readily discover the means by which the result is to be obtained."[74]

Colburn did not provide any rules in his textbook and discouraged teachers from providing them to students. The teacher should "furnish occasions for them to exercise their own skill in performing examples" and allow the student to "pursue their own method first." After trying their own method, "they should be made to observe and explain it, and if it was not the best, some improvement should be suggested."[75] Rather than memorizing mere "rules," students would induct general "principles" of arithmetic through their sense perceptions and a great deal of practice problems. As Colburn explains, "from particulars, we establish general principles, which serve as the basis of our reasonings, and enable us to proceed step by step, from the most simple to the more complex operations." Akin to the new fields of science that were emerging at the university level, "mathematical reasoning proceeds as much upon the principle of analytic induction, as that of any other science."[76] Even as Colburn attempted to make arithmetic seem less "abstract" in its presentation, the knowledge that students could develop *about* arithmetic became more abstract by revealing deeper foundations, or what was underneath arithmetic rules, in the form of principles.[77]

Due to arithmetic's particular hold on both the concrete and the abstract, and since arithmetic was as a result a "certain science," Colburn followed Pestalozzi in arguing that arithmetic was a key content area for providing children with a mental training. Arithmetic would build students' capacity to reason clearly and concisely on their own.[78] Rather than being the finale for teenagers wrapping up their experience in the common schools or being relegated to the trades, Colburn's arithmetic would be used as one of the first lessons children would be exposed to in the common schools.

In this dissertation, the issue of being "practical" is a recurring theme. In both mathematics and education expertise, the positively connoted idea of being "practical" (rather than "vulgar,"

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[72] See Monroe, "Development of Arithmetic as a School Subject," 60 on how Pestalozzi's mathematics was "impractical"; for the purpose of developing the mind rather than application in work. His work in arithmetic was relatively absent of problems. See page 65 on how Colburn drew from Pestalozzi the idea that mathematics should develop the child's intellect but added "practical" problems to his program. While still decontextualized from work, Colburn saw his problems as "practical" for the child by nature of drawing on familiar objedcts.

[73] Ibid., ix.

[74] Colburn, *Colburn's First Lessons: Intellectual Arithmetic, Upon the Inductive Method of Instruction,* iv.

[75] Ibid., iii-iv.

[76] Ibid., iv.

[77] Pestalozzi argued that the relations that "one and one are two, and one from two leaves one" were the foundations of arithmetic, explaining that "all future steps should be built upon the consciousness, deeply retained in the human mind, of the real relations of things which lie at the bottom of calculation. See Johann Heinrich Pestalozzi, *How Gertrude Teaches Her Children: An Attempt to Help Mothers to Teach Their Own Children and an Account of the Method, A Report to the Society of the Friends of Education, Burgdorf*, ed. Ebenezer Cooke, trans. Lucy E. Holland and Frances C. Turner (London: Swan Sonnenschein & Co., 1894), 210-211.

[78] Colburn, *Colburn's First Lessons: Intellectual Arithmetic, Upon the Inductive Method of Instruction,* 53.

"vile," or "mechanic") emerged just as both math and education became fields of academic study apart from their use toward achieving some other goal. Strangely, new enterprises labeled as "practical" were practical by nature of being academic rather than applied (or "mechanical," "rote," or "vulgar"). In this way, "practical" achieved a co-optation of the productive aspects of work into the context of the common schools, high schools and universities. We shall see the appeal to practicality not only in the discussion of schools of education and university mathematics departments, but also in the fact that pedagogical experts continually referred to themselves as "practical teachers" to emphasize commonalities with classroom teachers, even as experts became more removed from teaching.

The shift into "practical" academic work also revealed the importance of "foundations," or understanding that was somehow deeper and more conceptual, also by nature of not being in service of some ends outside of academics. In the case of Colburn's arithmetic, deeper principles emerged as an alternative to superficial rules alongside the introduction of decontextualized "practical" problems. Normal schools and schools of education would similarly appeal to the "foundations" of human development, or the search for a single unifying ideal for pedagogy, as experts looked for alternatives to teaching as a source of knowledge about teaching. Mathematicians would engage in a search for foundations as they took up pure mathematics in new research universities. Pure mathematicians contrasted their work on foundations to applied mathematics and became particularly interested in foundations just as they rallied to avoid teaching duties in favor of free time for research. In each case, the search for "foundations" was construed as a creative and productive enterprise, in juxtaposition with rote work. The next section outlines the chapters of the dissertation.

Overview of Chapters

The chapters of the dissertation are overlapping temporally but focus on the ascendance of different institutions and disciplines, namely normal schools, university schools of education, and university mathematicians. Whereas progressive pedagogies (also referred to as "constructivism" since the 1980s) are often analyzed in terms of their differences, particularly given that they are the objects of academic discussions and output, here I focus on the continuities and parallels in the core ideas and representation of teachers.

The second chapter, "Institutionalizing a "Science of Pedagogy" Against Teachers and Teaching" considers the process by which teachers' experience became irrelevant to the science of pedagogy between 1830 and 1890. I focus on pre-civil war textbooks for teachers, the importation of Pestalozzian and Herbartian reforms from Europe amidst the expansion of normal schools during the Reconstruction era, and initial efforts to develop a science of pedagogy in the university. Whereas pre-civil war textbooks drew on the authors' claims to experience even as they textualized their reflections, Reconstruction era reforms drew on celebrity constructivists' exceptional powers of perception and understanding in making short teaching stints the material for important theories and ideals. The roting of teacher education through the pre-packaging of European experts' ideals into "steps" for teachers was paired with a remaining interest in teaching experience as exemplified by the inclusion of practice schools in normal schools. As the constructivist science of pedagogy moved into the university, it gradually lost its connection with teachers and teaching, focusing on "empirical" child study, philosophy, and the training of new experts.

The third chapter, ""Doing" at the University of Chicago, 1894-1905" considers John Dewey's construction of "doing something in particular" versus "actually doing something" as a

case of rote versus mental work. Amidst the exploding Chicago labor movement, Dewey appropriated the constructiveness of labor (or "actually doing something") into his pedagogical theory and pragmatist philosophy, simultaneously re-envisioning labor as lacking constructiveness (or "doing something in particular"). Dewey's perceptions of the relationship between pedagogical experts and teachers also fit into this more general world view. Dewey portrayed teachers as lacking in scientific and rational capacity, whereas education experts were needed to construct new and rationalized educational systems. Dewey also characterized teachers, who in Chicago were teaching classes of forty or more, as mere disciplinarians, whereas in writing he was an expert in engaging students' interests. I additionally consider how Dewey's laboratory school, through which he was "actually doing something," as a case of resource hoarding from the broader Chicago school system. In his pedagogical theorizing and conceptualizations of teachers alike, Dewey ignored the role of work conditions and class relations in shaping teachers' work.

The fourth chapter, "Making a Math That Was More (Than Rote Work)" explores jurisdictional debates between early schools of education and mathematicians over the course of reforms in mathematics education from 1850 to 1910. Even as professors of education and mathematicians disagreed about the direction of curricular reforms, they agreed that teachers were teaching by rote and in need of intervention. For professors in schools of education and mathematicians alike, learning math by rote is juxtaposed with the formation of the student and researcher as "active producer" of new knowledge. Indeed, not only professors in schools of education but also mathematicians framed themselves as active producers of new knowledge in juxtaposition with teachers. The effort to avoid rote—even including teaching undergraduates, applied mathematics, or doing extensive calculations—went hand-in-hand with the turn to abstract "foundations" for educationists and mathematicians alike. This was part and parcel to broader shifts in the university.

I conclude with a review of this dissertation's major points, contributions to a number of research areas and potential implications for teacher education. I launch these concluding remarks through a discussion of writing this dissertation during the COVID-19 pandemic, which illuminated relations between mental and manual workers. I attempt to point to the problems of democratizing knowledge in a capitalist society.

Chapter 2
Institutionalizing a "Science of Pedagogy" Against Teachers and Teaching

"The office of teacher is in its nature the highest office. That it is not universally considered such, comes from the fact that so many have entered upon it without fitness of mind or character for its numerous duties, and that men are only beginning to estimate things according to their true value."

-George B. Emerson[1]

"Why should not every workman be an artist? A dinner-table with only potatoes and bread for food, and water for drink may still be the center of pleasing intercourse. It need not be a stall for feeding."

-Charles De Garmo[2]

In his popular 1847 normal school textbook, *Theory and Practice of Teaching*, David Perkins Page begins with a disclaimer on his use of the word "theory" and the "bad sense sometimes conveyed by that word." Page goes on to declare that "I have not been dealing in the speculative dreams of the closet, but in convictions derived from the realities of the school-room during some twenty years of actual service as a teacher."[3] Although Page was then removed from classroom teaching and endeavored to establish a theory and science of pedagogy on paper, he presented his written "theory" as springing from and made legitimate by his extensive teaching experience.

Page was not only Principal of the State Normal School at Albany, but along with other esteemed education advocates of the antebellum era including Horace Mann, Henry Barnard, Alonzo Potter, George B. Emerson and Warren Colburn, organized to establish systems of tax-funded public elementary (or common school) education in their respective states. These professional men additionally lobbied to develop tax-funded public teacher education in "normal schools," which would evolve into state universities in the mid-1900s. Page, Mann, Barnard, Potter, Emerson and Colburn were linked together across states—Massachusetts, New York, Connecticut and Rhode Island in particular—through the activities of the American Institute of Instruction.

A half-century after Page published his book and the common school and normal school systems had expanded impressively, experience teaching was viewed as not only irrelevant, but as a *disqualification* for making "theoretical" claims about teaching.[4] Instead, advanced university training and constructing new texts about progressive pedagogy, neither of which required teaching experience, were viewed as the new gold-standard for knowing about teaching. The "science of pedagogy" became ever-more removed from the daily work and goals of the teacher and focused instead on the process of publishing authoritative and transportable

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[1] Alonzo Potter and George B. Emerson, *The School and The Schoolmaster. A Manual for the use of Teachers, Employers, Trustees, Inspectors, &c., &c., of Common Schools* (New York: Harper & Brothers, 1842), 271.
[2] Charles De Garmo, *Herbart and the Herbartians* (New York: Charles Scribner's Sons, 1895), 238.
[3] David Perkins Page, *Theory and Practice of Teaching, Or, The Motives and Methods of Good School-keeping* (Syracuse: Hall & Dickson, 1847), 3–4. *Theory and Practice of Teaching* was the "first great classic in the field of American education" and "for nearly fifty years formed the essential basis for courses in general education in most of the normal schools of the United States." See Charles A. Harper, *A Century of Public Teacher Education* (Westport: Greenwood Press, 1970), 45–47 for a discussion.
[4] Andrew Gitlin, "Gender and Professionalization: An Institutional Analysis of Teacher Education and Unionism at the Turn of the Twentieth Century," *Teachers College Record* 97, no. 4 (Summer 1996): 601; Arthur G. Powell, "Speculations on the Early Impact of Schools of Education on Educational Psychology," *History of Education Quarterly* 11, no. 4 (Winter, 1971): 406-412.

documents. This shift occurred even as education experts centered "experience" over book-learning—but that of idealized children rather than actual teachers—in their theories. How was the knowledge of practicing teachers, as opposed to that of ex-teachers or those who had never taught at all, eviscerated from official knowledge about teaching?

In this chapter I build on the work of scholars who have noted or argued that the growth of university-credentialed experts in education in the latter half of the 1800s and beginning of the 1900s came at a cost to the teaching occupation. Scholarship has often focused on the expansion and feminization of teaching after the Civil War; whereby women teachers lost autonomy and authority as men secured jobs in a variety of new expert and managerial positions.[5] And yet, the embryonic "science of pedagogy," developed alongside institutions specifically for teacher education, was initiated when teachers were still primarily male. I attempt to re-examine how the early 'science of pedagogy" reflected and constituted relationships between teachers and non-teaching experts even in its very early development.[6]

The early "science of pedagogy" was additionally distinctly progressive. Experts advocated that teachers engage students' interests, draw on what was familiar to them, avoid rote instruction, and make learning a pleasant experience overall. Scholars have often considered the relationship between progressive pedagogy and the marginalization of schools of education in relation to other university departments and "administrative progressives."[7] Rarely has the content of early progressive pedagogy been considered systematically in its relation to evolving occupational dynamics between *teachers* and experts in pedagogy.[8] In this chapter I focus specifically on the role of progressive pedagogy in tracing the evolution from teacher experience being of value to being a liability. More specifically, while experts would continue to cite past teaching experience in forming their views, the *context* of currently being a teacher would increasingly preclude one from making claims about teaching.

I argue that the ideals of progressive pedagogy were shaped first and foremost in the need to create and legitimate non-teaching jobs with claims to know more about teaching than teachers

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[5] Geraldine Jonçich Clifford and James W. Guthrie, *Ed School: A Brief for Professional Education* (Chicago: The University of Chicago Press, 1988); Lawrence A. Cremin, *The Transformation of the School: Progressivism in American Education 1876–1957* (New York: Vintage Books, 1964); Andrew Gitlin, "Gender and Professionalization: An Institutional Analysis of Teacher Education and Unionism at the Turn of the Twentieth Century," *Teachers College Record* 97, no. 4, (Summer 1996): 588–624; Magali Sarfatti Larson, *The Rise of Professionalism: Monopolies of Competence and Sheltered Markets* (New Brunswick: Transaction Publishers, 2013); Arthur G. Powell, "Speculations on the Early Impact of Schools of Education on Educational Psychology," *History of Education Quarterly* 11, no. 4 (Winter, 1971), 406-412; Diane Ravitch, *Left Back: A Century of Battles Over School Reform* (New York: Touchstone, 2000); David B. Tyack and Elisabeth Hansot, *Managers of virtue: Public school leadership in America, 1820-1980* (New York: Basic Books, 1982).

[6] Cruikshank's dissertation on the Herbartian movement considers the ways in which career-minded men leveraged Herbartianism toward careers in normal schools and universities. I draw from her characterization of careerism in Herbartianism and the stereotypes of teachers that it leaned on extensively in this chapter. Kathleen Anne Cruikshank, "The rise and fall of American Herbartianism: Dynamics of an educational reform movement," PhD diss., (Madison: University of Wisconsin Madison, 1993), 89.

[7] David F. Labaree, "Progressivism, Schools and Schools of Education: An American Romance," *Paedagogica Historica* 41, nos. 1 & 2 (February 2005): 275-288; David F. Labaree, *The trouble with ed schools* (New Haven: Yale University Press, 2004); Ellen Condliffe Lagemann, *An Elusive Science* (Chicago: The University of Chicago Press, 2002); Ellen Condliffe Lagemann, "The Plural Worlds of Educational Research," *History of Education Quarterly* 29, no. 2 (Summer 1989): 185–214.; Jeffrey Mirel, "Bridging the "Widest Street in the World": Reflections on the History of Teacher Education." *American Educator* (Summer 2011): 6–12; Arthur G. Powell, *The Uncertain Profession: Harvard and the Search for Educational Authority* (Cambridge: Harvard University Press, 1980).

[8] For exceptions, see feminist analyses which argue that progressive pedagogy instantiates and mediates gendered relationship between teachers and pedagogical experts. Frances Maher, "John Dewey, Progressive Education, and Feminist Pedagogies: Issues in Gender and Authority," in *Feminist Engagements: Reading, Resisting, and Revisioning Male Theorists in Education and Cultural Studies*, ed. Kathleen Weiler (New York: Routledge, 2001), 13–32; Valerie Walkerdine, "Femininity as Performance," *Oxford Review of Education* 15, no. 3 (1989): 267–279.

themselves. In generating a knowledge base for non-teachers about teaching, normal school administrators and the burgeoning group of experts in education would draw on the permanent negative aspects of the bureaucratic structure of mass schooling in order to generate "eternal principles" for teaching. Providing simultaneous instruction for a large number of young people necessitated routines, procedures, discipline and practice. It would also always require the consideration of students as a group rather than as individuals. In staking their claims against discipline, against routine, and in favor of the student as a unique individual, progressive pedagogical theorists could ensure that their principles would indeed be as eternal as the school itself.

In turn, theorists pegged the more unpleasant aspects of school bureaucracy on teachers' discretion, claiming that practicing teachers were fanatics for routine and punishment by nature, rather than contextualizing them in the new mass institution of public schooling. In contrast, normal school administrators and education professors could always claim, as they avoided working directly with children and focused on their writing, to be the source of a better and more freedom and democracy-embracing, child-friendly knowledge about pedagogy. Even as they repudiated de-contextualized book knowledge for children, the new experts would promote their own de-contextualized book knowledge as a means of providing moral education for an intransigent teaching force.

The chapter proceeds in three parts. The first section, "From Teaching to the Text," considers pre-Civil War efforts at textualizing official knowledge about teaching for use in teacher training. Authors of teacher training textbooks claimed that their knowledge sprung from and was legitimated by extensive teaching experience, even as they argued that teachers without preservice training in "ideals" would fail and likely cause harm to students. The second section, "Importing Observation and Understanding from Europe," considers the deepening invisibilization of teachers' knowledge about teaching concomitant with the feminization of teaching around the Civil War. Pestalozzian and Herbartian ideals imported from Europe served as the vehicle for invisibilization and wielded huge influence in the United States. Drawing on Pestalozzi and Herbart, emerging education experts emphasized that leveraging what students were interested in and familiar with could both create deeper understanding and help mitigate practicing teachers' tendency toward an overreliance on routines, procedures, and punishment. European tenets for constructivist pedagogy were as much about the formation of an expert persona that was both more charitable and rational than teachers as it was about teaching methods. The third section, "A University Science of Education," describes the eclipse of teachers' skill as nascent university education departments sought to self-differentiate from normal schools. They argued that not only teachers but normal schools were incapable of anything more than rote and emphasized the importance of decontextualized theory. I offer concluding remarks.

1. From Teaching to the Text

In the first half of the 1800s, prior to the Civil War, the movement to expand state-funded education (particularly public elementary or "common" schools) gained considerable traction. Alongside it grew the movement to establish state-funded teacher education in "normal schools," and positions in normal school administration. This section considers the development of a "science of pedagogy" in textbooks for pre-service teachers as a knowledge base for pre-service teaching education. I focus on textbooks developed before 1850, as state-funded normal schools

were only beginning to open in the United States.[9] I show that the early science of pedagogy, while generally drawing from and being legitimated by experts' past teaching experience, also made initial moves to delegitimate teachers themselves as a source of knowledge about teaching.

Early authors of textbooks for pre-service teachers stereotyped teachers—from whose ranks they were proud to have come themselves— as merely doing work for pay, lacking empathy for students, and leaning into the dehumanization of children, discipline and routine. Normal school training was needed less to build teachers' skill at teaching and more to grapple with the well-known moral "deficiencies" of teachers. Certainly, normal schools would claim a connection to practice through administrators' past teaching experience and the custom of including practice schools on normal school sites. However, the "scientific" aspects of teacher training, as delineated in textbooks and away from the realities of teaching practice, were predominantly moral and ideological. This occurred within a broader expansion of professional education toward the production of the middle class alongside moral education for the poor whites and people of color. Indeed, teacher education would strike a strange middle.

In the first subsection, "The Science of Pedagogy," normal school textbook authors prescribe that, while teachers need experience, they also need *ideals* to train them out of a work-for-pay mentality and to inform how they would shape students. In the second subsection, "Order is Heaven's First Law," our authors argue that the teacher must have routines and good discipline in order to manage their class, but that they also need the science of pedagogy to teach them to engage students' interests and avoid excessive punishment. In the third subsection, "Mere Rote Learning," normal school textbook authors argued that, even in classes that appeared to be high functioning, it was possible or even probable that students were merely doing work and keeping order rather than learning anything at all. Similarly, teachers might not only be committed to students doing rote, but to being rote workers themselves. This could be rectified by training teachers to dedicate their time and commitment wholly to the school, despite inadequate remuneration and difficult work conditions.

A. The Science of Deficiency

The early 1800s saw the proliferation of various institutions for elementary education, such as schools with fees for middle class students as well as Sunday Schools, Lancastrian (i.e. Monitorial) Schools and infant schools for poor whites, and African Free Schools for Black students. Whereas in older countries such as England there was substantial debate about whether to educate the poor or not, in the northern United States people generally agreed that educating the poor was a good idea. Whereas in the impressively expanded education system of Prussia education for the poor was wholly independent from that of middle-class students, in the U.S.'s northern states education for the poor gradually expanded to become local and then state systems of public education for poor, working class *and* middle-class white children. As one amongst a number of competing organizations for providing education for poor students would gain the lion's share of government funding, it would then take over the efforts of other organizations, and provide an initial infrastructure of supervision and teacher training.[10]

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[9] By 1850 only five normal schools had been opened, three of which were in Massachusetts, one in New York, and one in Connecticut. List of normal schools from appendix of Christine A. Ogren, *The American State Normal School: An Instrument of Great Good* (New York: Palgrave MacMillan, 2005), 212-235.

[10] Carl F. Kaestle, *Pillars of the Republic: Common Schools and American Society 1780-1860* (New York: Hill and Wang, 2011). Elementary education for Black students was sometimes integrated but more generally segregated; northern school integration was an issue for huge debate in the mid 1800s. Kaestle also notes the different use of the terminology "public" and "private" in the 1800s, and also that this was not a clear either-or issue.

In general, pre-service teacher education at the time consisted of a liberal arts education in an academy (a private high school, as public high schools were not established yet), possibly with the addition of lectures based on the experience of experienced teachers. Teachers in training, who were typically men, might also be able to join a teacher-specific department or "teacher seminary" at their academy. Neither the typical liberal arts training at an academy nor the specific "teacher seminary" offered much in the way of instruction on how to teach or practice doing it. While attaching teacher education to academies fostered relationships between common schooling and "higher education," it also led to the problematic escape of teachers-in-training into more lucrative businesses.[11]

The creation of the first schools aiming to specifically provide teacher training in the early 1820s suggested that teaching had a specific knowledge base. However, it was not expected that teacher training would result in teachers fully comprehending it. As James G. Carter would explain, it was not reasonable to assume that all teachers in training could be made "adepts in the science." However, "having seen correct general principles of education successfully reduced to practice, they may at least become artists in the profession and be able to teach pretty well upon a system the philosophy of which they can not thoroughly comprehend."[12] In an effort to delineate such a knowledge base, the Reverend Samuel Read Hall, who had established one of the first teacher training institutions in 1823, published his *Lectures on School-Keeping* in 1830. As one of the first textbooks widely used in teacher education, it has also been credited as the first attempt at developing scientific principles for teaching.[13]

Hall's intent was "to give all the directions as much of a practical character, as possible."[14] In addition to providing short notes on each of the school subjects, Hall provided heuristics on classroom management and gaining the trust and confidence of students. Particularly given his station, Hall frames his project humbly and matter-of-factly:

> The Author does not expect that *all* will correspond with him, in the views he has taken of various subjects, nor, does he dare to believe that all his directions are the best that could be given. But, they are the best, that he could give. And he does firmly believe, that by attentively following them, teachers will be able to accomplish *much more* than has been usual, in training children and youth to habits of application, and in assisting them to gain necessary knowledge.[15]

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[11] See for example, Potter and Emerson, *The School and the Schoolmaster*, 247–248 for commentary on the problems of teacher training in the academies, including a lack of practice teaching, that the teacher-training elements were sporadic, and providing excess liberal education to teachers-in-training, causing them to become "dissatisfied with their duties" and "anxious to push themselves forward in a different career." These problems would continue even as teacher training moved to the normal schools, due to the propensity for normal schools to draw tuition from students wishing to use them as "peoples' colleges." See David F. Labaree, An uneasy relationship: the history of teacher education in the university," in *Handbook of Research on Teacher Education: Enduring Questions in Changing Contexts,* 3rd Edition, edited by Marilyn Cochran-Smith, Sharon Feiman-Nemser, D. John McIntyre and Kelly E. Demers (New York: co-published by Routledge, Taylor & Francis Group and the Association of Teacher Educators, 1990), 290–306. Prior to pre-service teacher training, teacher institutes for practicing teachers were popular, and in all reality remain popular to this very day, although they are likely more attached to pedagogical experts then in the 1800s.

[12] James G. Carter on Popular Education in the "Boston Patriot" during the winter of 1824-5, cited in Grace C. Bibb, "Normal Departments in State Universities," *The Addresses and Journal of Proceedings of the National Education Association, Session of the Year 1880, at Chautauqua, New York.* Second Day's Proceedings. (Salem, Ohio: Allan K. Tatem, 1880), 53.

[13] Samuel Read Hall, *Lectures on School-Keeping* (Boston: Richardson, Lord and Holbrook, 1830), iv. See Harper, *A Century of Public Teacher Education*, 13–14 for a description of Hall. The preface was signed in 1829 and I have seen this as an alternate publication year for the book. Hall was an innovator of early private or "academy type" teacher seminaries; the precursors to the state normal schools. On the role of Hall in developing a science of pedagogy see Dorothy Rogers, *Oswego: Fountainhead of Teacher Education, A Century in the Sheldon Tradition* (New York: Appleton-Century-Crofts, Inc., 1961), 3.

[14] Hall, *Lectures on School-Keeping,* iv.

[15] Ibid., v.

Despite the lack of pretense, Hall also formulated his science of pedagogy as an antidote to the well-known failings of teachers. Without outlining exactly what the benefits of common school education were supposed to be, Hall notes that the "very general opinion" was that "the amount of benefit desirable" was "not obtained from these primary fountains of knowledge."[16] It was also a "very general belief, that one of the most common defects is the improper character and superficial qualifications of teachers." Many primary school teachers were "deficient in almost every necessary qualification." Failing to deal with the deficiencies of teachers, the effort to "increase the usefulness of schools, can be attended with only partial success."[17]

Hall's proposed solution was the development of "institutions… for educating teachers, where they should be taught not only the necessary branches of literature, but, be made acquainted with the *science of teaching* and the mode of *governing* a school with success." These topics should be a subject of *much study*, before one engages in the employment of teaching." While Hall acknowledges that while "it is true, that many have engaged in teaching school, without having gained any knowledge of the nature of their work," that was not a good reason for following their example, and "thus render[ing] your labours useless, or even injurious, to the children under your care." In Hall's view, "no one ought to assume the office of teacher, without having endeavored first to obtain some correct views of the subject."[18] Given no other clues into what exactly Hall means by the "science of teaching" and "correct views of the subject," we can probably safely assume that this meant what was in his textbook.

Hall qualifies his view on the necessity of pre-service training with the point that, "I do not assert, that you can learn every thing perfectly in regard to the nature of your employment, without *experience*," but for the teacher as well as the physician, attorney and minister, "they still use all the means within their reach, to become acquainted with the nature of their several professions, as far as may be, before entering upon them."[19] He also points to the value of "frequent conversations with teachers," who "will be able to impart to you the results of their own experience." However, Hall also warned that teachers may tell you of "strong prejudices against every innovation which you may find it necessary to make;" Hall notes that the new teacher should "listen not to such language of your brethren so far as to be discouraged, but only for the purpose of knowing the difficulties in your way, in order that you may rise above them."[20]

While those providing and advocating for education for the poor had set their sights on free common public schools in the 1820s, they were unable to increase rates of attendance until the 1830s. However, by the 1830s, the common school movement was fully underway, common school enrollments were growing, and many Massachusetts cities even had public high schools.[21] Furthermore, a new generation of education reformers were establishing themselves.[22] The American Institute of Instruction, the first "long-lived" education association in the United States, was founded in 1830 with a membership that consisted of many teachers but also a

[16] Ibid., iiv.
[17] Ibid., iv. Complaints about the ignorance of common-school teachers by educationists became widespread by the 1940s. See Kaestle, *Pillars of the Republic*, 35.
[18] Ibid., 2.
[19] Ibid., 43.
[20] Ibid., 45.
[21] Kaestle, *Pillars of the Republic,* 160–161.
[22] Kaestle, *Pillars of the Republic,* Chapter 3: Urban Education and the Expansion of Charity Schooling.

number of legislators, businessmen, and other "friends of education." That said, the Institute ambiguously identified themselves as mostly "practical teachers."[23]

The aforementioned Samuel Read Hall was a leader in founding the Institute, as was Horace Mann, a Massachusetts legislator who pushed for common schools and was able to secure the position of Secretary of the Massachusetts State Board of Education through the Institute's activities.[24] Henry Barnard was a Connecticut legislator and Commissioner of Education of Connecticut and for the United States who advocated for improved common school supervision. Warren Colburn was a businessman-cum-prolific arithmetic textbook author. Despite this elite participation, the history provided by then-President George Barrell Emerson notes that "many of us are, and most of us have been, teachers in the Common Schools."[25] Indeed, teaching was a preliminary position on the way to careers for many professional men of the early 1800s and even into the early 1900s. Despite the popularity of noting how unfit teachers were for their work within the Institute, the members reported "a strong fellow-feeling with teachers," and "ask[ed] them to come and take counsel together with us."[26]

The Institute was founded for the purpose of "promot[ing] the cause of popular education, by diffusing useful knowledge in regard to it." This included "elevating the character of instruction, of widening its sphere, of ascertaining more clearly what should be its objects, and of perfecting its methods." The Institute further took up the purpose of "raising the teacher, by making him feel how high and noble is the work in which he is engaged, how extensive and thorough must be his preparation, and how entire his devotion."[27] In general, they took up these goals because they believed that

> a good school is a temple of liberty; that education is the most important pillar in the fabric of a free state; that, in a political as well as in a moral sense, it is only the *truth*, the knowledge of the TRUTH, which can make men free.[28]

The exchange of knowledge was a primary means by which the Institute geared to develop new truths themselves, "humbly believ[ing] that we do sometimes discover something new; new methods, new modes of influencing the conduct, new modes of presenting truth, and new modes of acting on the mind of a child."[29] The "lectures, reports, and discussions" were "upon most of the subjects of interest to the practical teacher, and to the community as acted on by him." These

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[23] George Barrell Emerson, *History and Design of the American Institute of Instruction* (Boston: Ticknor, Reed, and Field, 1849), 9. While the Institute had an illustrious membership it ultimately became overshadowed by the National Teachers' Association and therefore abandoned. The National Teachers' Association would ultimately become the National Education Association. On the issue of fluidity between occupations, see also Richard Hofstadter, "The Revolution in Higher Education," in *Paths of American Thought,* eds. Arthur M. Schlesinger, Jr. and Morton White (Boston: Houghton Milton, 1963), 269–290. As an example of occupational and disciplinary fluidity, Samuel Stillman Greene, who would eventually serve as NTA president between 1864 and 1865, started his career as a teacher in Worcester, Massachusetts for three years before resigning in 1840 on account of poor health and then working as superintendent of schools in Springfield for three years. He then went back to public school teaching, albeit in Boston between 1842 and 1849. From this post in Boston, Greene became an agent of the Massachusetts Board of Education and then superintendent of schools in Providence. Starting while still superintendent of schools in Providence, Greene would become professor of didactics, then mathematics and civil engineering, and then natural philosophy and astronomy professor at Brown. Even while at Brown, Greene had founded a normal school in Rhode Island

[24] The state superintendent of schools was an early form of an education expert. They focused non gathering and diffusing information on education. Part because state superintendents were unable to enact coercive control over education in the United States, and partially because they didn't want to, they functioned primarily as the state's head educational persuader. For a lengthier description see William T. Harris, "Horace Mann," *The Journal of Education* 44, no. 8 (August 27, 1896): 140–142.

[25] Ibid., 9.

[26] Ibid., 9.

[27] Ibid., 4. See also Richard B. Michael, "The American Institute of Instruction," *History of Education Journal* 3, no. 1 (Autumn, 1951): 27–32.

[28] Michael, "The American Institute of Instruction," 10.

[29] Ibid., 10.

included instruction in the various school subjects, school management and discipline, school architecture, moral and religious education, "the development and education of the mental faculties," the philosophy of mind, and various types of schools including Infant Schools, Monitorial Schools, Schools of Arts, Manual Labor Schools, Agricultural Schools, "education for the Laboring Classes, academies, high schools, and common schools.[30]

Even in calling upon teachers to take counsel with them in these academic practices, leaders of the American Institute of Instruction drew distinction between the ways in which teachers and other professionals could participate. President George B. Emerson noted that reports given at the meetings of the American Institution of Instruction were "delivered by men eminent in their respective professions, and by skilful teachers." Lectures "upon methods of instruction and discipline" came "from many of the most experienced teachers," whereas lectures "upon the moral relations of education" came from "some of the deepest thinkers and best men." In general their work "formed a body of science, thought, and practical wisdom, unsurpassed, we think, by any series of works in the language on the subject of education."[31] In turn, the "great object of the science of education was to render the minds of children to be "the fittest possible instruments for discovering, applying, and obeying the laws under which God has placed the universe." In order to achieve this, the teacher would have to become "right-minded and right-hearted himself; that is, he must have his intellectual and his moral nature rightly and highly educated."[32] This was presumably by following the prescriptions of the "deepest thinkers" and best men on the "moral relations of education."

The imperative to educate everyone was powerful, as on the one hand, "the most precious thing under heaven—if, indeed, it is to be considered *under* heaven—is a highly endowed and highly educated human soul." On the other hand, "the completely uneducated soul is brutish, and little better than the life of a beast."[33] While teachers played an important role in this trajectory between the "highly educated human soul" and the "brutish," they also presumably were sitting somewhere in the middle, pending the advance of extended teacher education.

Thus, the American Institute would make the expansion of public teacher education alongside the expansion of the Common Schools a primary concern. Experts and Institute affiliates drew inspiration from the invention of normal school training in Prussia and France, where it was state-funded and normal schools hosted a "practice school" for children in which techniques could be modeled and attempted. Massachusetts was the first state to provide state-funded normal schools, with the very first established at Lexington. In Cyrus Pierce's Lexington normal school, teacher training was done through example and incidental remarks, weekly lectures, and through practice at the model school, an innovation borrowed from Prussia.[34] The second was Barre Normal School (later moved to Westfield), and the third was at Bridgewater, founded by Horace Mann with Nicholas Tillinghast as its first principal.

Before the Civil War began, David Perkins Page's *Theory and Practice* and Potter and Emerson's *The School and the Schoolmaster* were the two major books about education available.[35] All three men were esteemed members of the Institute. David Perkins Page's book was prefaced with a description of his extensive teaching experience and qualification as Principal of the State Normal in Albany, New York. Alonzo Potter was Professor of Moral

[30] Ibid., 6–7.
[31] Ibid., 4–5.
[32] Ibid., 11.
[33] Ibid., 10.
[34] Kaestle, *Pillars of the Republic,* 172–173.
[35] Rogers, *Oswego*, 4.

Philosophy at Union College and had also served as a minister.[36] George B. Emerson had been principal of a boys' high school and most notably a girls' school, but it is proclaimed that he had also "long been a celebrated practical teacher of youth" in the textbook's introduction.[37] Emerson's experience was primarily as an administrator and professor; he had only spent two years working at a private school in Massachusetts and a handful of summers teaching in country schools during his vacations from college at Harvard. However, at this point in the formation of U.S. educational occupations, the distinction between who was and wasn't a "practical teacher" remained nebulous.[38]

Page emphasized that his book provided experientially-based "convictions," and the goal of the lectures within was "the inculcation of such practical views as would best promote the improvement of the teacher."[39] He also emphasizes that his "theory may justly mean the *science* [of teaching],*"* leveraging science's connotation as being in touch with some experiential reality. And yet, this was still "the *science* distinguished from the *art* of Teaching." While "in practice these should never be divorced," here they would be divorced by necessity in order to generate a book on teaching.[40] Actual teaching was rendered subtly split into its supposedly mental and manual aspects. That said, few would object to engaging in teaching as an art, even if it was newly construed as manual work.

Akin to Hall's textbook, Emerson, Potter and Page highlight the deficiencies of teachers. Potter, opening a discussion on how to improve the common schools, borrows a quote from French Prime Minister François Guizot that "it is the master that makes the school." Despite the importance of the school teacher, the fact that "a large proportion of common school teachers are not well qualified for their duties, is so generally admitted, that proof of it would be superfluous." He turns instead to "how the evil can be corrected," but also borrows from Guizot the explanation that teachers were generally those who had failed at some other occupation.[41] Page similarly explains that

> too many teachers are found in our schools without the spirit for their work which is here insisted on. They not only have not given their attention to any preparation for their work, but resort to it from motives of personal convenience, and in many instances from a consciousness of being unfit for every thing else! In other professions this is not so.[42]

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[36] The State Normal in Albany was the first normal in New York. Union College is in Schenectady New York and ran a grammar school. See Kaestle, *Pillars of the Republic*, 78-80. for a discussion on how the educational development of Schenectady was similar to that of New York and Philadelphia in the early 1800s. Independent pay schools accounted for the majority of the schools. Philanthropic efforts led to the creation of Lancaster, African School, Sunday School and Infant School Societies. These school options were converted to free public schools in the 1850s.

[37] Potter and Emerson, *The School and the Schoolmaster.*

[38] For Emerson's biography see "George B. Emerson," *Proceedings of the American Academy of Arts and Sciences* 16 (May 1880-June 1881), 427-429. On the ambiguity of who counted as a teacher see Wayne J. Urban, "Higher Education and the National Education Association: A Sesquicentennial Review," in *The NEA Almanac of Higher Education* (Washington, DC: The National Education Association, 2007), 27–40. When the NTA was established, high school teachers were generally considered to be a part of higher education rather than as a part of the common school system. The NEA's Department of Higher Education included academy and high school teachers until 1887 when the Department of Secondary Education was formed. For the evolving fate of high school teachers see also David F. Labaree, "Proletarianizing the High School Teacher, "Proletarianizing the High School Teacher." Washington, D.C.: National Institute of Education, 1986. As I conducted this dissertation research, I never encountered a reference to an "impractical teacher" or an indication of who would be one. My sense is that the frequent use of "practical teacher" in teacher organizations was not only incidentally vague but intentionally vague as well.

[39] Page, *Theory and Practice of Teaching*, 3–4.

[40] Ibid., 3–4.

[41] Potter and Emerson, *The School and The Schoolmaster,* 236-237. François Guizot was Prime Minister of France prior to the 1848 revolution.

[42] Page, *Theory and Practice of Teaching*, 10.

Page goes on to highlight the specific deficiencies of teachers, even breaking these down according to several types of deficient people who enter teaching.

Page was also concerned about teachers' problematic tendency to reject the "correct principles in the science of education."[43] For Page, the science of pedagogy was an antidote to the fact that many "have entered the teachers' profession without any idea of the responsibilities assumed or of the end to be secured by their labors, aside from receiving, at the close of their term, the compensation for their service in dollars and cents." [44] Teachers were presumably lacking in a professional orientation that would make their work more than a rote exchange of hours for pay.

The lack of "an adequate idea of what constitutes an education" had led to "the most deplorable mistakes," caused by "blindly experimenting amidst the wreck of their heaven-descended material, maiming and marring," even by those with good intentions.[45] While Page does not account for what exactly constitutes an education, the teacher should have "an *ideal* of a well-educated human soul, tenanting a healthy, well-developed human body; an ideal which he at once and systematically labors to reach, as does the sculptor when he quarried marble." [46] Less important than what ideal this would be was that there was one in play. The risks were high; the "spectator" or "false teacher" would ruin the student, whereas the "true educator" was a master artisan, cultivating the human spirit.

While David Perkins' Page's science of pedagogy claimed to be grounded in (past) teaching experience, this connection was already being broken. Already in 1847, the science of education was not embedded in current teaching practice, but rather a moral philosophy generated largely by school administrators.[47] For Page, teachers "should follow a study of the science of education, the end that the teacher may interpret the lessons of daily experience, and thus be helped to grow into higher and higher degrees of competence."[48] For teachers, "the antecedent to *doing* is *knowing*; it is only the quack who will venture to learn his art by the practice of his art."[49] Page notes that

> if every teacher must settle every doubt by experiments upon his classes, the progress that is made in the science and art of teaching must be at the untold expense of each new set of children; -just as if the young doctor could take nothing as settled by the experience of his predecessors, but must try over and over for himself the effect of all the various medical agents in order to decide whether arsenic does corrode the stomach and produce death…[50]

Teachers were to learn what experts had to say and then do (or apply) it. The normal school textbook left an opening for a philosophy that would provide a directional ideal for instruction at the same time that it would be used to analyze teachers and their work.

And yet, despite the emergence of a science of pedagogy that teachers would apply, normal schools would stay in touch with practice through the inclusion of practice schools on site, and even encourage teachers' own experimentation. Potter describes that the normal school should be an institution that is

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[43] Ibid., 25–26.
[44] Ibid., 68.
[45] Ibid., 66.
[46] Ibid., 69.
[47] Powell, *The Uncertain Profession*, 39-40.
[48] Page, *Theory and Practice of Teaching*, 22–23.
[49] Ibid., 22.
[50] Ibid., 121.

> pervaded by the free spirit of learners; not one that proposes to lay down stereotyped processes of teaching, but one that will excite its members to propose themselves high objects, and to prosecute those objects in a generous and ever-progressive spirit.[51]

The goal of building teacher experience was supported by the structure of the normal school, which was generally a model and/or practice common (elementary) school with teacher training facilities running interrelatedly. However, the class sizes were often extremely small.[52] Teachers in training would learn to teach by doing teaching, and through focusing on "practical" topics, such as conducting tests and achieving "superb craftsmanship in classroom management."[53] Teachers were taught to experiment to develop new teaching techniques, and normals were intended to draw from what teachers in the common schools were doing.[54] Additionally, teachers-in-training were taught to reflect on their own experience teaching as a means of achieving an ""independence of thought" from subject matter experts".[55] Clifford and Guthrie note that nineteenth century normal schools were "as closely connected to the master-apprentice system and to learning-by-imitation as was practicable in an institution that taught students in sometimes sizeable groups.[56]

However, while the curriculum was emphasized to be experiential, the science of education was first and foremost about the use of philosophical principles as a means of guiding practice.[57] At one of the earliest normal school conventions, normal school principal Alpheus Crosby stated that "any course of professional training *which is not merely mechanical or empirical* [italics added], must have for its basis a thorough consideration of the principles of the profession, of its philosophy." This philosophy would "underlie and give form to all the attention which may be paid to practical methods." Practical methods "must be constantly changing accordingly as circumstances change," but "principles are in their nature eternal… [and] for the training of educators, the prime subject of study should be the principles of education.[58]

The experience-based normal school training participated in a broader shift from apprenticeship to professional school for many occupations, including medicine and law.[59] The emphasis on experience seems to indicate an encroaching lack thereof for the experts conducting teacher training. Normal school textbook authors and professors claimed to not have the deficiencies of teachers by nature of having left teaching. Even as the science of pedagogy was

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[51] Potter and Emerson, *The School and The Schoolmaster*, 249. This is contrasted on page 253-254 to the Lancastrian or monitorial method of teacher education through apprenticeship, as per a report by the State of Education in Holland. While the Lancastrian system was useful due to being cheap and due to not providing access to other occupations to which teachers in training might escape, it was "very apt to engender habits of routine; every defect which has got into the school takes root; the scholar and future teacher adopts, blindly at first and afterward follows with interested minuteness, the whole manner of the master on whom all his hopes depend, and thus generation after generation of teachers may succeed, without one step in the way of improvement being made."

[52] Rogers, *Oswego,*4.

[53] Merle L. Borrowman, "Liberal Education and the Professional Preparation of Teachers," in *Teacher Education in America: A Documentary History*, ed. Merle L. Borrowman (New York: Teachers College Press, 1965), 19 (as cited in Clifford and Guthrie, *Ed School*, 57).

[54] Harper, *A Century of Public Teacher Education*, 115-16 (as cited in Gitlin "Gender and Professionalization," 596).

[55] Gitlin, "Gender and Professionalization," 593–96.

[56] Clifford and Guthrie, *Ed School*, 56. See also Rogers, *Oswego: Fountainhead of Teacher Education*, 4 on that in pre-Civil War normal "the lectures on teaching [were] largely drawn from the instructor's experience."

[57] On the issue of laws and rules for practice as a science of pedagogy, see Christopher J. Lucas, *Teacher Education in America: Reform Agendas for the Twenty-First Century* (London: Palgrave Macmillan, 1999), 62.

[58] Merle L. Borrowman, *The Liberal and Technical Teacher Education, A Historical Survey of American Thought* (New York: Bureau of Publications, Teachers College, Columbia University, 1956), pp. 25–26 (as cited in Lucas, *Teacher Education in America*, 62).

[59] Clifford and Guthrie, *Ed School*, 55. In addition to apprenticeship, Clifford and Guthrie also discuss for-profit professional schools as another "casualty of university-based training."

claimed to emerge from teaching experience, this was specifically the past teaching experience of experts. In contrast, teachers would potentially be able to implement the science but could not be expected to understand it. Despite elite members of the American Institute of Instruction's efforts to identify with "practical" teachers rhetorically, they drew considerable distinction between how practicing teachers and experts could think. Teachers were deficient and in need of moral training, but through interaction with the new experts in normal schools there was hope that they could be improved and inspired to focus on ideals as opposed to their remuneration. The stakes were high, because students and their souls could be easily injured by bad methods.

B. Order is Heaven's First Law

Early pedagogical experts explained that, while routines, procedures and discipline were key to success at teaching, teachers often over-disciplined students and used strict classroom management techniques. They argued that if teachers would provide lessons that engaged the student and drew on familiar objects and situations, they would have much less need for discipline. Obviously, achieving these goals is easier said in textbook form than achieved in actual teaching practice, as children need to be protected from their own developing judgement. Rather than providing specific routines and management strategies, normal school textbooks emphasized the ideal of teachers appealing to students' "interests" and the personality traits that teachers needed to be successful in producing disciplined students. This tended to invisibilize the actual skill and strategy required to successfully manage a classroom of children, reducing it to discipline. In turn, the parts of teaching that were rendered actually valuable (students' interests) were specifically the terrain of pedagogical experts' advocacy.

Teachers in the early common schools were mostly male, under the direct management of local parents, and chosen for their physical capacity to control the class.[60] Carl Kaestle argues that school discipline was emphasized through the desire to avoid crime, to create productive work habits across classes and through parents' expectations, but perhaps most of all out of necessity; teachers needed discipline in order to teach large numbers of students of a wide variety of ages effectively.[61] Even (and particularly) in the earliest days of enacting the vision of democratic spread of knowledge through common schools, knowledge was meted out to children through compulsion.[62] Accordingly, early normal schools took care to train their students in classroom management and normal school textbooks took care to comment on it.

In his 1830 normal school textbook, Reverend Samuel Read Hall addresses "management" and "government" at length and before attempting to approach the pedagogy of specific subjects. Hall explains that the teacher must "reduce every thing to system" including answering questions and handing out copies.[63] Hall additionally advocates for firmness, noting that "unless you govern those placed under your care, all your other exertions will be nearly or quite in vain." As a teacher you must gain "subordination of the part of your scholars" and "good government on

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[60] Judith Kafka, *The History of "Zero Tolerance" in American Public Schooling* (New York: Palgrave Macmillan, 2011), Chapter 2; Michael W. Sedlak, "Let Us Go and Buy a School Master": Historical Perspectives on the Hiring of Teachers in the United States, 1750–1980," in *American Teachers: Histories of a Profession at Work*, ed. Donald Warren (New York: Macmillan Publishing Company, 1989), 257–290.

[61] Carl Kaestle, *Pillars of the Republic*, 93-97 rebuts the idea that common school discipline was first and foremost needed to train students for future work in factories.

[62] See Carl Kaestle, *Pillars of the Republic*, 17 on how late 1700s education ideologists of the common schools wanted to use the schools to subordinate youth to the state and thus make them citizens.

[63] Hall, *Lectures on School-Keeping*, 73.

your own" in order to make any progress in teaching.[64] Government was distinct from and a precursor to instruction.

This did not mean to subordinate students with anger; "correction administered in anger has no effect to humble or reclaim the offender."[65] Hall similarly notes that while corporal punishment may at times be needed, "it is undoubtedly true, that corporal punishment should be the last resort."[66] By the 1840s, educators (particularly those advocating the monitorial system) were advocating moral persuasion and regimentation above corporal punishment, although corporal punishment was still seen as sometimes necessary.[67]

Hall tentatively related teachers' efforts to make students interested in what they were learning to a reduction in the need for corporal punishment. At the very least, interest was needed in order to help students learn the material better. For Hall, "the progress of the pupil will depend very much upon the interest he is made to feel in the subject."[68] This required some appeal to the familiar; even topics "which excite no attention on account of their commonness, would awaken very high interest, if explained in a familiar manner." As examples, Hall provides "the formation of clouds, rain, and snow"; "the transmission of sound"; "the turning of a wheel"' and "the power of a wedge, or screw." For Hall, "what the young most need, is to learn to think and to investigate… whatever serves to fix a habit of reflection is of incalculable importance."[69]

Hall notes with a hint of skepticism that what he recommends "appears to have been achieved by Pestalozzi." At the experimental school of Swiss educationist Johann Heinrich Pestalozzi, as reported by Madame de Stael, "it is a remarkable circumstance that neither punishment nor reward is necessary to excite his pupils in their labors." Pestalozzi's school was "perhaps the first instance where a school of one hundred and fifty children had succeeded without having recourse to the principles of emulation or fear." This was achieved on the idea of drawing on what was already familiar and comprehensible to students and by attempt to make learning "pleasant."[70]

David Perkins Page's normal school textbook emphasizes a dual need for discipline and for awakening students' interests. Page notes that "ORDER IS HEAVEN'S FIRST LAW: … the ability to secure and maintain it is no mean part of the *qualification* of the good teacher."[71] He dedicates a full chapter of his text to "means of Good Order," emphasizing the need for teachers to be fair in their discipline rather than any specific strategy for making this happen. For example, Page writes that "the despot commands for the sake of being obeyed." In contrast, "government in its proper sense, is an arrangement for the *general good,* -for the benefit of the *governed* as well as of the ruler…that is not good government which seeks any other object.[72]

For Page, and despite the need for maintaining good order, good government was related to the teachers' capacity for "exciting an interest in study."[73] Concerning interest, "the intelligent teacher feels that this is *the* great question; for he foresees that, if he fails here, his difficulty in governing his school will be very much increased." Page specifies that this interest "must be an

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[64] Ibid., 56.
[65] Ibid., 56.
[66] Ibid., 71.
[67] Carl Kaestle, *Pillars of the Republic*, 91-93.
[68] Ibid., 95.
[69] Ibid., 39.
[70] Ibid., 82.
[71] Page, *Theory and Practice of Teaching,* 148.
[72] Ibid., 153.
[73] Page, *Theory and Practice of Teaching*, 78.

abiding interest" rather than a short-lived or artificial one, taking up arms against competition ("emulation") in particular.[74]

Emerson and Potter, even while appealing to progressive values, would lean into the need for discipline. Their manual for "teachers, employers, trustees, inspectors, &c., &c., of common schools" notes that "it is by no means to be assumed that each child is an angel in disguise." The teacher will find not only "much that requires regulating and directing," but also "that which needs to be repressed, with a stern hand."[75] At the same time, Potter emphasizes that toward the "preservation of order," it is key to "*render your school pleasant.*" He clarifies that it is not order, silence, or study that is unpleasant, but rather having children work for too long or to be exposed to poorly ventilated rooms, scolding and lessons that are unclear and monotonous.[76]

Early teacher training textbook authors explained that teachers needed to draw on students' interests, and more generally "make the school pleasant" in order to avoid excessive discipline. And yet, they also made nods to the importance of discipline and classroom management, albeit through particular ideals rather than suggested practices. The further advance of normal schools involved the spread of the idea that students needed even less discipline emanating from the teacher, both in terms of classroom behavior and content. The increased popularity of student interest amongst education experts would preclude the existence of practicing teachers who were already engaging student interests and avoided excessive discipline to the extent possible. It also invisibilized the skill and strategy involved in "classroom management"; setting up classroom routines and procedures and dealing with inevitable discipline issues.

C. Mere Rote Learning

While early educationists wanted education to provide freedom, they also wanted to prepare children to take their future places as citizens. United States Treasurer and polymath Benjamin Rush famously described in 1798 that "I consider it as possible to convert men into republican machines. This must be done if we expect them to perform their parts properly in the great machine of the state."[77] While this general sentiment remained popular into the 1800s, the use of "machine" in a positive connotation fell dramatically out of favor. A chief concern of early normal school textbook writers was the avoidance of "mechanical and monotonous modes of instruction."[78] This section discusses the way that the early theorists of the "science of pedagogy" invoked the risk of rote learning and promoted understanding as an antidote. Akin to discipline, pedagogical experts could continually claim, in imagining the day-to-day work of an occupation they weren't taking part in, that teachers were enforcing rote upon their students. The implication was that teachers were teaching by rote as well.

Hall describes that students frequently endured "a dull and formal round of labour, in which young and volatile minds appear to feel but very little interest."[79] While for Hall in the early 1800s, this was both an issue of deficient teaching and inadequate funding for the common schools education, the blame would be more squarely placed on teachers in subsequent decades. Rote learning was not the same as excessive discipline but was also construed as deeply related to it; both invoked the moral deficiencies of the teacher, could be resolved through "interest," and had their antithesis in "true learning."

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[74] Page, *Theory and Practice of Teaching*, 119.
[75] Potter and Emerson, *The School and The Schoolmaster*, 51.
[76] Ibid., 487-489.
[77] Cited in Kaestle, *Pillars of the Republic*, 17-18.
[78] Potter and Emerson, *The School and The Schoolmaster,* 246.
[79] Hall, *Lectures on School-Keeping*, 20.

However, true learning was hard, if not impossible, to come by. Even in a classroom that appeared to be operating smoothly, it was still entirely possible that no actual learning was happening. Experts in pedagogy were needed to discern the difference. As Hall writes,

> Many have appeared to imbibe the sentiment, that the whole business consists in keeping order in the schoolroom, and going through a daily round of exercises in reading, spelling and writing, the teacher, meanwhile, furnishing copies, making pens, and performing certain operations in arithmetic, which the students may not be able to perform themselves. But all this has little better claim to the name of teaching, than the chatter of the magpie has to be dignified with the title of language. Such a course may be entirely destitute of intellectual exercise; and is like the operation of a machine.[80]

Citing an article discussing the tendency to deal with books as "so many little machines," Hall emphasizes that the book is merely "the *instrument* which you are to teach them how to use, in order to obtain the knowledge desired." The "principal duty of an instructor" was, rather than teaching the book, "to teach [students] to exercise their own powers, and elicit their own strength."[81]

In order to achieve this, teachers would need to focus on the specific "*mode*" of instruction; including the need to "make every study as *pleasant* as possible," to draw on what is "familiar" and comprehensible to the student, and to facilitate students in developing true understanding.[82] The teacher would need to internalize the idea that "*to teach is to communicate ideas*," and to teach, "it is indispensable that you should be *understood."*[83] This meant asking students questions until "you *know* they understand the subject… when this is done, you will have done your duty, and not till then."[84]

Internalizing the need to be understood also meant that the teacher "should put himself in the place of the child, and then inquire what course, it would be necessary for him to take, to gain a knowledge of any subject with which he was not familiar."[85] As an example of teachers' failings in this arena, Hall provides the example of "little Laura" whose teacher once gave her an overly complicated explanation to her question about carrying tens in addition, thus causing her to quit arithmetic, whereas before she had enjoyed it. The threat of teacher failure loomed large, and indeed "the injury to little Laura was very great."[86]

Page similarly described the problem of students absorbed in "mechanical work," warning that "one may have acquired in the mechanical way a great amount of knowledge, and yet have no profitable mental discipline."[87] A "large portion of our scholars study for the sake of preparing to recite the lesson," as these scholars who "have no idea of any object beyond *recitation*" and "study mechanically." Akin to Hall, Page warns that "they endeavor to remember phraseology, rather than principles; they study the *book,* not the subject." As students endeavored to remember the words, their "vacant countenance[s] too often indicate[] that they are words without meaning."[88]

Emerson and Potter's 1847 normal school textbook includes a section on the "Prevailing Errors in Regard to the Nature and End of Education," of which first and foremost was that

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[80] Hall, *Lectures on School-Keeping*, 45.
[81] Ibid., 78. He cites the Journal of Education No. 19.
[82] Ibid., 81.
[83] Hall, *Lectures on School-Keeping*, 46.
[84] Ibid., 78.
[85] Ibid., 46.
[86] Ibid., 79.
[87] Page, *Theory and Practice of Teaching*, 25.
[88] Ibid., 24.

"education is regarded simply as the means by communicating to the young certain *mechanical accomplishments*, which, in the progress of society, have become essential to our comfort and success." This view led to the common opinion that "a child is educated when he can read, write and cipher." [89] As opposed to a true education, "that that is called *knowledge*" consisted primarily of "mere rote-learning and word-mongery." The child is

> said to be educated, because it can repeat the text of this one's grammar, and of that one's geography and history; because a certain number of facts, often without connexion or dependance, have, for the time being, been deposited in its memory, though they have never been wrought at all into the understanding, nor have awakened, in truth, one effort of the higher faculties.[90]

The wrong methods would leave "the mind of a child… nearly passive—merely receiving knowledge as a vessel receives water which is poured into it."[91] Indeed, for Potter and Emerson the "pouring in" method was related to an older model of teaching; citing a Prussian author he notes that during generations past teaching was "a mechanic art not unlike that of a cobbler," in that teachers were mechanically pouring knowledge into students. Back when "reading was imparted by the most simple method of syllabation… [and] arithmetic without the least indication of the natural relations existing between numbers… any man was deemed to fit to hold the office of schoolmaster in an elementary school."[92]

In the more modern view, "intellectual vigour and activity are more important than mere rote learning." In order to achieve this, Emerson and Potter advocate that the teacher "awaken a child's faculties; give him worthy objects on which to exercise them; invest him with proper control over them, and let him have tasted often the pleasure of employing them in the acquisition of truth." In this way, the child will be trained to "gain knowledge for himself" and "to *think*, and *love*[] *to think*, " gaining "a moral and intellectual *character.*"[93] This did not mean that the acquisition of knowledge didn't matter, but rather that the effort to "communicate knowledge" and to "develop the powers of the soul" would be "in truth… inseparable."[94]

Rather than being a training exclusively for elite students, the avoidance of rote was envisioned as a training that would benefit all. Emerson and Potter understood that most students attending the common schools would inevitably be laborers, often in husbandry. Indeed, for the Prussian system that they were seeking to emulate, the common schools were "intended exclusively for the education of the working class," whereas the "higher seminaries of learning" where for "those who intend to devote themselves to the liberal professions." In comparison, the U.S. system seemed much more equitable. This was even demonstrated by the fact that white males could graduate from common schools for the working classes, secure a teaching job, and leverage that on the way to an even more professional occupation.[95] Emerson and Potter envisioned an education that would promote productivity and a "knowledge of the *application* of the first principles of science" to students' diverse eventual occupations as universally beneficial.[96]

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[89] Potter and Emerson, *The School and The Schoolmaster,* 29.
[90] Ibid., 32.
[91] Ibid., 34.
[92] Ibid., 237. The citation in the footnote on page 236 is "see a paper on the Former and Present Condition of Elementary Schools in Prussia, by N. Wittich, native of Tilsit, Prussia, in the first volume of the publications of the Central Education Society."
[93] Ibid., 30; 33-34.
[94] Ibid., 33.
[95] Ibid., 244.
[96] Ibid., 57.

After all, "any two men, however remote from each other… they are still, if engaged in lawful callings, partners." It was thus "a matter of unspeakable importance, that each one should be qualified to perform his part, in the most efficient and useful manner." Emerson and Potter explain that "it can hardly be necessary to insist that *education* does contribute most powerfully to render men more efficient both as *producers* and *preservers* of property."[97]

Through education in the common schools, "a labourer, whose mind has been disciplined by culture, works more steadily, and, therefore, more productively, than one who, when a child, was left to grovel in ignorance and idleness." Such a laborer was additionally, "having both the knowledge and habitual activity of mind… fruitful in expedients to render his exertions more diversified and profitable."[98] In short "the hand is found to be another hand when guided by an intelligent mind." Furthermore,

> those who have been blessed with a good common-school education rise to a higher and higher point in the kinds of labour performed, and also in the rate of wages paid, while the ignorant sink, like dregs, and are always found at the bottom.[99]

And yet, while a training for productivity was universally applicable, the teacher should "have regard constantly to the probable destination of the child." Hall notes that "it would be improper to direct the preparatory studies of a merchant or mechanic, in the same manner as those of him who intends to be a schoolmaster or a physician."[100] Emerson similarly noted that schools need to adapt "to *the future conditions and pursuits of a child*," while avoiding acting as if this specific destination were already fixed.[101]

Viewing students' future occupations as fixed would promote them going straight to an apprenticeship in their adopted profession, rather than to the common school, in order to train for the "one common destination, to which all the people of this country seem appointed, and that is the life of useful, and, in most cases, laborious occupation." Children needed to "be taught early, by example and by precept, that there is respectability and happiness, in a life of labour."[102] They need to particularly be taught the value of husbandry and horticulture, as most Americans would find productive work as "well-educated cultivator[s] of the soil."[103]

Emerson and Potter also go on at length to describe that the point of education was not "*to give us worldly success and consideration.*"[104] Happiness "is not to be bought with money." Rather, "it is the reward of inward effort— of self-control."[105] They offer that the goal of education should not be "nurturing expectations which cannot be fulfilled, and turning the minds on a track which must lead to a sense of continual disappointment, and thus of wrong." Rather, the teacher and the society more broadly should "hold out to our humbler friends the appropriate and attainable, nay, unfailing ends of a *good* education."[106]

Similarly, normal school textbook authors argued that teachers should value productivity above pay, even as they noted that conditions in the United States for teachers were terrible. This was particularly in comparison to Prussia, where teachers were paid well enough to buy a house

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[97] Ibid., 113.
[98] Ibid., 113.
[99] Ibid., 114.
[100] Hall, *Lectures on School-Keeping*, 77.
[101] Potter and Emerson, *The School and The Schoolmaster*, 56.
[102] Ibid., 56.
[103] Ibid., 57.
[104] Ibid., 57.
[105] Ibid., 58.
[106] Ibid., 59.

and received a pension upon retirement.[107] Even when it involved substantial self-sacrifice, teachers should dedicate their entire selves to the work of teaching, as failure to do so came with great risks. Hall describes that the teacher must "*be willing to devote your whole time, and strive to make the most judicious use of it.*" Any time that was not reserved by the teacher in advance was presumed to be the property of those who had employed the teacher.[108] Page clarifies that the "*true spirit of the teacher"* would "seek[] not alone pecuniary emolument," "looks upon gold as the contemptible dross of the earth" and "scorns the rewards of earth." Potter explains that if the teacher's goal is "to teach for a few months for the sake of money, and if it is apparent that their thoughts are interests are away from the school, they will deserve little respect, and need expect none." The teacher who "betake[s] themselves to this employment merely to escape hard work… should, in such case, remember that their labours are an injury rather than a blessing, and that they merit neither pay, nor consideration."[109]

The concern with monetary reward, which was indeed a huge concern for chronically underpaid common school teachers who typically depended on others' free hospitality for shelter, was put in a dichotomous relationship with the spirit that desired "to be in the highest degree useful to those who are to be taught; a spirit that elevates above every thing else the nature and capabilities of the human soul, and that trembles under the responsibility of attempting to be its educator."[110] Indeed, the risks were great, and the teacher "should feel that his mistakes, though they may not speedily ruin him, many permanently injure his pupils." Mistakes made out of ignorance were particularly abhorrent in a "place where ignorance itself is sin; and where indifference to the well-being of others is equivalent to willfull homicide."[111]

To summarize this section, early normal school textbooks saw drawing on students' interests and what was familiar to them as not only a way of mitigating against excessive discipline, but also as mitigating against excessive rote instruction, which was what teachers were generally presumed to be doing. For normal school textbooks, the assumption was that rote classrooms were engaging students in mindless work in which they took a passive role rather than true learning. The "filling up a pail" method of a teaching was a two-sided problem; on the one hand students were learning by rote, and on the other hand teachers were doing their jobs in a rote fashion. Experts saw both the student and the teachers as needing moral reform that could be brought to both by teachers' normal school education; normal schools would train teachers in valuing true learning over rote, and in turn students would do the same. This was against the tendency of both teachers and students to view their time in the classroom as mere work for pay, rather than as an opportunity to be productive. Students and teachers alike would need to accept their pecuniary lot and focus instead on developing their character and discipline.

Early normal school textbooks formulated a science of pedagogy partially separated from practice, took initial steps toward idealizing student interest as a means of avoiding over-discipline, and idealized true learning as an alternative to rote or "mechanical" instruction. And yet, even as they generated a textual and idealized version of teaching apart from the actual work of doing it, they were careful not to stray too far from the classroom. The early scientists of pedagogy often attempted to legitimate their work through appeals to extensive experience as "practical teachers," and normal schools contained their own practice schools. Even while the scientists of pedagogy idealized students' interests, they maintained that good classroom

[107] Potter and Emerson, *The School and The Schoolmaster*, 239.
[108] Hall, *Lectures on School-Keeping*, 52-53.
[109] Potter and Emerson, *The School and The Schoolmaster*, 243.
[110] Page, *Theory and Practice of Teaching*, 9-10.
[111] Ibid., 12.

management and firm discipline were needed. While they did not delineate routines or procedures that would help promote learning, at the least they indicated that the teachers should have some. The early scientists of pedagogy provided little advice on how to teach well apart from listing the moral qualities that teachers would need to be successful.

The American Institute of Instruction would wane alongside the common school movement, and the National Teachers' Association (NTA), which would overshadow the Institute, was formed in 1857. By this time the early state teachers' organizations had grown substantially, and the NTA represented an effort to join forces. Annual meetings focused on pedagogy, the organization of schools, and attempts to wield policy influence. Both NTA and the state teachers' associations provided avenues for men who were teachers to gain visibility on their way to careers in teacher education, given that these organizations provided a means for teachers to interact with the new ranks of education administrators and education experts.[112] The NTA emphasized in its formation that it was an organization for "practical teachers," even as it included university professors, normal school principals, and a variety of experts.[113] For generations, NTA meetings would serve as a vehicle for pedagogical experts to gain recognition for new schools of thought.[114]

Prior to the Civil War, the field of education gained substantial capacity to share information and make public claims for intellectual turf through an increase in education journals. These included the publications of teachers' organizations or state superintendents. One particularly well-cited example was Henry Barnard's *American Journal of Education*, established in 1856. Early publications advocated for increased common schools and teacher education, increased money spent on teaching, and increasing students' stay in school into high school. Akin to the NTA annual meeting, the overwhelming point was philosophical commentary on pedagogy. As teachers could not afford these journals, probably could not spare the time, and in all likelihood would gain little from reading them, education journals were primarily used and cited by pedagogical experts. [115]

2. Importing Observation and Understanding from Europe

This section considers the progressive manual training teaching programs of Johann Heinrich Pestalozzi and Johann Friedrich Herbart. Despite that Pestalozzi and Herbart were working in Europe, their programs dominated the educational scene in the United States, particularly after the Civil War. Pestalozzi served primarily as a normal school administrator but gained widespread acclaim through his writing as the prototype of a pedagogical expert before he achieved this position. Herbart was a university professor. Both Pestalozzi and Herbart's methods were institutionalized in the well-developed Prussian common school, high school and

[112] Kaestle, *Pillars of the Republic,* 170-172.
[113] The emphasis on the "practical teacher" was meant to be more exclusive than the inclusion of the "friends of education" by the American Institute of Instruction. From a present perspective it is unclear what was meant by either. See Thomas W. Valentine, "National Teachers' Association, Proceedings of Convention for Organization," in *Proceedings of the National Teachers' Association Afterward the National Education Association From Its Foundation in 1857 to the Close of the Session of 1870,* edited by Henry Barnard (Syracuse: C. W. Bardeen, 1874), Volume 1: 11–13; William Russell, "National Organization of Teachers: An address to the Convention of Teachers of the United States, Held in Philadelphia, August 27, 1857, for the Purpose of Forming a National Organization of Their Profession," in *Proceedings of the National Teachers' Association Afterward the National Education Association From Its Foundation in 1857 to the Close of the Session of 1870*, edited by Henry Barnard, Volume (Syracuse: C. W. Bardeen, 1874), Volume 1: 15–24.
[114] The NTA would later become the NEA (National Education Association).
[115] Kaestle, *Pillars of the Republic,* 170-172.

university system and gained popularity across Europe before Americans interpreted and imported them.[116]

European pedagogical methods became the rallying cry for the advance of normal schools after the Civil War, as these institutions rapidly expanded alongside the common schools. Whereas four normal schools were established in the 1840s and five in the 1850s, twenty-five normal schools were established during the 1860s and thirty-four were created in the 1870s.[117] These institutions served a pre-service teaching force that was increasingly female.[118]

Females would work for less and had less upward mobility. As Potter had pled in the 1840s, female teachers were needed to help deal with the likelihood of white men escaping to more lucrative opportunities because "in this country, broad avenues to success seem to open before every young man as he enters life." For Potter, keeping permanent teachers was an important aspect of educational improvement, and male teachers were unlikely to be permanent.[119] Women were also cheap; and in the mid-1800s were paid only half as much as their male counterparts.[120]

In addition to being cheap labor, Americans argued that female teachers could work to solve social problems in the United States through their innate capacity with moralsuasion. Whereas men were supposed to be active and therefore might hinder the child's development by being overbearing, women were passive and therefore could provide a supportive and even spiritual environment for children's growth.[121] Pestalozzian and Herbartian methods would leverage supposed female qualities as a part of their pedagogy. And yet, even as teaching was women's biologically pre-destined occupation, the increasingly female teaching force was increasingly stereotyped as overly disciplinarian, enforcing rote instruction, and needing more advanced training despite their natural moral endowments.

Moralsuasion had its appeal in the U.S. context where urban poverty was expanding, and the education of poor European immigrants, freed black children and indigenous children were becoming an issue of greater concern. Protestant reformers positioned poverty as a problem of an individual's state of mind. Children should be trained to be industrious and productive (rather than idle) no matter what their eventual occupation or social station. Carl Kaestle explains that this was a "two-edged sword"; it was an attempt to eradicate permanent poverty, but also explained poverty as a punishment for being lazy. As children were innately innocent and still in the process of developing, they could be rescued from the indolent and sinful habits of their parents through a good moral education. Rather than through granting educational credentials or mobility, education was envisioned by experts as generating equality through moral uplift.[122]

Pestalozzi and Herbart's teachings bore considerable similarity in values to what early American normal school textbook authors had advocated. However, Pestalozzi and Herbart drew

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[116] Other European pedagogues including Friedrich Fröbel also had a large following, but here I have reduced my scope to Pestalozzi and Herbart as the two major movement-makers.

[117] Calculated from the list of normal schools from appendix of Christine A. Ogren, *The American State Normal School: An Instrument of Great Good* (New York: Palgrave MacMillian, 2005), 212-235.

[118] Michael W. Apple, "Gendered teaching, gendered labor." *Critical Studies in Teacher Education: Its Folklore, Theory and Practice* (London: The Falmer Press, 1987), 57-84; Clifford & Guthrie, *Ed School*; Labaree, *The Trouble with Ed Schools;* Lagemann, *An Elusive Science*; Paul H. Mattingly, "Workplace Autonomy and the Reforming of Teacher Education." *Critical Studies in Teacher Education: Its Folklore, Theory and Practice* (London: The Falmer Press, 1987), 36-56.

[119] Potter and Emerson, *The School and The Schoolmaster*, 239. Horace Mann agreed that increasing the number of woman teachers was an important initiative, particularly for young students.

[120] Kaestle, *Pillars of the Republic*, 163-165.

[121] Catherine E. Beecher, *A Treatise on Domestic Economy: For the Use of Young Ladies At Home and At School* (New York: Harper & Brothers Publishers, 1848); Horace Mann, *A Few Thoughts on the Powers and Duties of Woman: Two Lectures* (Syracuse: Hall, Mills, and Company, 1853). See also Kaestle, *Pillars of the Republic,* 116-118.

[122] Kaestle, *Pillars of the Republic*, 109-113; 118-119; 125-126.

an even tighter link between the engagement of students' interests, the whole-hearted avoidance of rote instruction, and the reduction of a need for punishments. Whereas early American textbooks for pre-service teachers had asserted that the teacher should have *an* ideal of the student, Pestalozzi asserted that there was *only one* ideal or pathway of development, and Herbart asserted that he had apprehended it.

Pestalozzi and Herbart's methods were also advocated as scientific advances over the science of pedagogy of prior decades; Pestalozzi's through the use of induction and Herbart's through the use of a philosophical approach to psychology. In turn, the increasing ranks of male education experts packaged the pedagogical implications of Pestalozzi and Herbart's insights into "rules" for teachers to obey by rote, leaving less open to the experimentation or discretion of the teacher. This was even as experts stereotyped teachers as exacting a tyranny of rules and authoritative knowledge and prescribed that they provide children with the freedom to experiment instead.

The importation of Pestalozzi and Herbart into the U.S. was as much about developing a persona for the pedagogical expert as it was about teaching methods. Pedagogical ideals came with narratives about non-teaching experts in teaching attached. Pestalozzi himself recounted his life of being a self-sacrificial, empathetic, experimental and disorganized steward of children; he was anything but the image of the rote task-master. Herbart had inherited Kant's chair of philosophy and brought deep conceptual and rational understanding to the image of the pedagogical expert; understanding teaching was more effective when it wholly separated from actual teaching. The following two sections, "The Pestalozzian Missionary Angels" and "Herbart and the Herbartians" describe this trajectory.

A. The Pestalozzian Missionary Angels

While Pestalozzian methods began to trickle into the United States in the first decade of the 1800s, they did not gain widespread popularity until the 1860s. Americans encountered the story of Pestalozzi's life, accounts of Pestalozzian schools in Switzerland and Prussia, and translations of his writings through a combination of publications and heresay. In Prussia, Pestalozzi's methodology had gained widespread popularity and "possession of the whole [Prussian] common school system by 1825."[123] In the United States, Pestalozzi would come to represent an empathetic approach to teaching, induction from concrete particulars, developing the skills already present in the child, and oral instruction in avoidance of book knowledge.[124] While Pestalozzi's most enduring affiliation was as a normal school administrator in Yverdun, he achieved his greatest success as a writer and constructor of the image of the pedagogical expert (in contrast to the teacher) before he started there.

The first Pestalozzian experiments in the United States were brought about by William Maclure, a Scottish merchant who had found considerable success in the United States and taken an early retirement to engage in the sciences and radical philanthropy, and Joseph Neef, one of Pestalozzi's "assistants" and a specialist in physical education. Maclure met Neef in Paris and was inspired to visit Pestalozzi's school at Yverdon. Maclure was impressed with the fact that Pestalozzi was teaching the children of the "useful" class "useful" knowledge. Failing to recruit Pestalozzi to come to the United States, Maclure recruited Neef, and they established a Pestalozzian school near Philadelphia in 1809. While that effort ended in 1812, the two would

[123] Henry Barnard, Pestalozzi and Pestalozzianism: *Life, Educational Principles, and Methods, of John Henry Pestalozzi; with Biographical Sketches of Several of His Assistants and Disciples* (New York: F. C. Brownell, 1859), 149.
[124] Cruikshank, "The rise and fall of American Herbartianism," 89.

combine forces again starting in 1826 in their attempt to establish another Pestalozzian school in New Harmony, a Utopian experimental community in Indiana.[125]

Pestalozzi's methods and reputation gradually caught on. In 1821, Warren Colburn published an arithmetic book based on Pestalozzian methods that earned both Colburn and Pestalozzi a widespread following in the United States. The very first meeting of the American Institute of Instruction in 1830 featured a paper on the Pestalozzian method in music from William C. Woodbridge, who visited Pestalozzian schools in Europe on numerous occasions. He announced that in central Europe, the Pestalozzian method was acknowledged "in its fundamental principles, to be the only true one."[126]

In the early 1830s (as the story goes), the Reverend Charles Brooks, upon merely hearing about Pestalozzi's methods from a German professor on a boat trip across the Atlantic, was possessed like a "missionary angel" and began vigorously agitating for state-supported normal schools teaching Pestalozzian methods in Massachusetts. His new motto was "*As is the teacher, so is the school."*[127] Three normal schools were established in Massachusetts between 1839 and 1849—Framingham, Westfield and Bridgewater—but would rarely receive credit for their adoption of Pestalozzian methods.[128] Between 1839 and 1849, Henry Barnard distributed pamphlets on Pestalozzian methods amongst the common school teachers of Connecticut based on his visits to the Pestalozzian schools in Europe.[129]

In 1843, Secretary of the Massachusetts Board of Education Horace Mann discussed European education in his seventh report, elaborating on his extensive visits of European schools and particularly the successes of Prussian educators. He emphasized their empathetic methods and lack of corporal punishment.[130] In providing this report, Mann drew the rath of Boston academy and common school teachers who felt that their methods of teaching students to criticize and verify texts were being caricatured. Meanwhile, Pestalozzian methodsemphasized oral teaching and neglected reading and analyzing texts.[131] Regardless, Mann would permanently adopt Pestalozzian principles in his theorizing; for example that the teacher needed a deep knowledge of the whole student (which was subject to continual change), facilitating students' "self-activity" through "the *exhibitory, explanatory,* and *inductive method,*" and reducing the use of "coarse and harsh appliances… as substitutes for those true and genuine sources of interest."[132]

Telling the story of Pestalozzi's life was an important part of circulating his theory and communicating his method. In works such as *How Gertrude Teaches Her Children,* Pestalozzi would provide a mixture of autobiography and pedagogical principles, portraying himself as an idealized teacher; a worker of miracles and empathetic to a fault. This story would be told and

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[125] Leonard Warren, *Maclure of New Harmony, Scientist, Progressive Educator, Radical Philanthropist* (Bloomington: Indiana University Press, 2009), Chapter 6: Introduction of Progressive Education to the United States. While Pestalozzi wanted to educate students to do well in the class they were already in, Maclure thought that his pedagogy had the possibility to upset the less stable class relations of the United States. The attempt to establish a Pestalozzian school in New Harmony failed because the Indiana senate voted against it. See also Will S. Monroe, *History of the Pestalozzian Movement in the United States: With nine portraits and a bibliography* (Syracuse: C.W. Bardeen, 1907), 51-52.

[126] Monroe, *History of the Pestalozzian Movement in the United States,* 144-145.

[127] Harper, *A Century of Public Teacher Education*, 17-19.

[128] Monroe, *History of the Pestalozzian Movement in the United States*, 135.

[129] Rogers, *Oswego*, 19.

[130] Horace Mann, "Visitation and Description of European Schools- Deaf-Mutes Taught to Speak Successfully," in *Annual Reports on Education* (Boston: Lee and Shepard, 1872), 230-418.

[131] Harris, "Horace Mann," 142.

[132] For a summary of Horace Mann's ideas see John A. Nietz, "Horace Mann's Ideas on General Methods in Education," *The Elementary School Journal* 37, no. 10 (June., 1937): 742- 751.

retold by generations of education experts. Through his extremely dramatic career in providing industrial education for the poor of Switzerland, Pestalozzi developed an ideal of the supportive, sensitive teacher who could apprehend the needs and interests of the child. Whereas Pestalozzi's teaching stints were short-lived, his writings on teaching and development of a teacher education institution at Yverdun would allow for the proliferation of his ideas all over Europe and beyond. His story is revealing for the development of the persona of the pedagogical expert; more empathetic, more self-sacrificing, more persevering, more intelligent (and more well-to-do) than any other teacher imaginable.

Pestalozzi had enacted the worst fears of Hall, Emerson, Potter and Page by failing at careers in the ministry, in law and in agriculture—he was too sensitive for most pursuits—before deciding to become a teacher. Having failed at the Rousseau-inspired, Swiss-upper-middle class, late eighteenth-century fad of getting back to Nature through amateur farming, Pestalozzi turned his farm at "Neuhof" into an "Industrial School for the poor."[133] Embracing another trend of the day, Pestalozzi recruited poor children to grow cotton on the farm for room, board, and elementary instruction.[134] As described by William Maclure,

> In thus joining mental with corporeal labor, the Pestalozzian system [at Hofwyl] has a great advantage in all schools of industry; for it not only produces both knowledge and property at the same time, but gives a habit of working and thinking conjointly, which last during life, and doubles the powers of production, while it alleviates the fatigue of labor by a more agreeable occupation of the mind.[135]

However, the path was not easy. Even despite the addition of poor children, Pestalozzi's effort to grow cotton on the farm had proven unprofitable, as his land was unfit for farming. His farm was failing and his wealthy wife continually bailed him out. However, Pestalozzi felt that his failing farm helped him better empathize with poor children. Through the guidance of "an over-ruling Providence," Pestalozzi learned "even in my misery… to know the misery of the people and its causes deeper and deeper, and as no happier man knows them." He claimed that "I suffered as the people suffered; and the people showed themselves to me as they were, and as they showed themselves to no one else… I sat long years among them, like an owl among birds."[136] Pestalozzi maintained that he "lived like a beggar in order to learn how to make beggars live like men."[137]

Rather than being caused by peoples' material situation and various forms of oppression, however, Pestalozzi learned that the actual cause of misery for the poor was improper teaching methods which failed to provide them with an adequate moral training.[138] Poor teaching caused laziness, drunkenness and criminal habits, but good teaching could train the poor to be productive even given their difficult circumstances. Pestalozzi would persevere to resolve this problem, "alone and lonely towards my one sole end-to stop the sources of the misery in which I saw the people around me sunk."[139]

Pestalozzi had to close his school within the span of five years. However, having felt that he had learned a substantial amount about education, Pestalozzi spent the next 18 years exclusively

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[133] Ibid., 16-18; 21. Pestalozzi had started his farm as part of a broader trend of farming among upper-middle class young people in order to enact Rousseau's back-to-nature idea.
[134] Ibid., 18-19; 22.
[135] Monroe, *History of the Pestalozzian Movement in the United States,* 51-52.
[136] Pestalozzi, *How Gertrude Teaches Her Children,* 11.
[137] Ibid., xviii.
[138] Ibid., 12.
[139] Ibid., 9.

writing about teaching, publishing some famous and some less famous accounts of his educational aspirations.[140] . He drew substantially from Rousseau's anti-institution *Émile*. As described by the aforementioned J.A. Green, "the general attitude of [*Émile*] toward educational practices current at the time was that everything was wrong, and, to be right, it was only necessary to do the opposite of what the world generally was doing."[141]

Despite the fact that child labor was an important part of Pestalozzi's school model, he put the child's freedom as the first principle of education. This required that the teacher mitigate their efforts to control the child and impose knowledge on him:

> Be thoroughly convinced of the immense value of liberty; do not let vanity make you anxious to see your efforts producing premature fruit; let your child be as free as possible, and seek diligently for every means of ensuring his liberty, peace of mind, and good humor. Teach him absolutely nothing by words that you can teach him by the things themselves; let him see for himself, hear, find out, fall, pick himself up, make mistakes; no word, in short, when action is possible. What he can do for himself, let him do it; let him be always occupied, always active, and let the time you leave to him represent by far the greatest part of his childhood. You will then see that Nature teaches him better than men.[142]

Indeed, Nature, or in other words absolutely no one, could serve as a better teacher than practicing teachers.

After his 18-year hiatus from teaching, Pestalozzi applied to the Swiss government for funding to start an orphanage in Stans. Rather than training poor children to be dissatisfied with their lot, Pestalozzi would teach them how to be poor; more frugal, productive and more resourceful. As described by Hermann Krüsi, one of the teachers who would work under him and ultimately spread his Method in the United States, "in his younger days he had cherished the idea that the welfare of the people could be obtained merely by the improvement of outward circumstances," but as he got older he "saw and felt the important truth, that, for man to be truly free, his moral nature must be developed and cultivated."[143]

During the five months during which Pestalozzi ran the school before it was taken over by the French, it was claimed that Pestalozzi's progress was miraculous. As one commentator in Henry Barnard's *American Journal of Education* would later explain, Pestalozzi had learned "by experience, how powerful an instrument for training the young is to be found in labor for bread, when under skillful management."[144] However, teaching and the hostility of the locals had exhausted him, so he retired to an Alpine health resort. Pestalozzi would later return to teaching for a short stint in Burgdorf before becoming a principal and founding an "Educational Institute for the Children of the Middle Classes." After the government demanded the school building, he eventually started an experimental school in Yverdun complete with an infant department for orphans, a secondary boarding school for boys, a normal school for young men and a

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[140] Ibid., 22.
[141] John Alfred Green, *The Educational Ideas of Pestalozzi* (London: W. B. Clive, 1905), 9.
[142] Johann Heinrich Pestalozzi, "Diary, 1774" in *Great Pedagogical Essays: Plato to Spencer,* ed. Franklin Verzelius Newton Painter (New York: American Book Company, 1905), 353-355.
[143] Hermann Krüsi, *Pestalozzi: his life, work and influence* (Cincinnati: Wilson, Hinkle & Co., 1875), 17. Krüsi worked with Pestalozzi for 18 years.
[144] William De Fellenberg, "Pestalozzi, De Fellenberg and Wehrli," *The American Journal of Education* 10, no. 24 (March 1861), 82–92. Fellenberg notes that as aristocratic students came to Pestalozzi he could not get them to engage with industrial training as they were "not obliged to support themselves by manual labor." The relationship between William De Fellenberg and Pestalozzi's collaborator De Fellenberg remains unclear to me.

pedagogical seminary for trained and experienced teachers which would reach the height of its fame in 1807.[145]

Offering written advice for mothers and teachers almost interchangeably, Pestalozzi established an ideal of the teacher alongside the image he gave of himself as effeminately perceptive, sensitive and self-sacrificing.[146] Pestalozzi drew inspiration not only from his own mother, but moreover from his maid Barbara, or Babeli. Pestalozzi's father was a surgeon who passed away young, asking his maid to remain with his family after his death to help raise the children, and she did. In adulthood, Pestalozzi credited the self-sacrifice of this working-class woman, working for a middle class widow and her children, in informing his ideas about teaching.[147]

Methodologically, Pestalozzi emphasized that empathy for the students would reduce the need for corporal punishment or harsh discipline. He felt that teachers should gain children's obedience and attention by gaining their love and trust.[148] In order to do this, teachers would need to adapt to the idiosyncratic and evolving needs of children. The rod only needed to be used "in the solitary cases where sensory excesses must be frightened away by sensory pains."[149]

Teachers should also only present students with ideas that they could understand in full and in the moment. Taking up arms against teaching by rote, Pestalozzi held that rote instruction occurred because the students were introduced to knowledge they weren't ready to understand yet, causing them to resort to mere memorization. Pestalozzi believed that "the child is very much disturbed by a wordy system of teaching," and that words could "actually hinder observation and prevent real understanding of the objects immediately about us."[150] Success in teaching "depends upon whether what is taught to children commends itself to them as true, through being closely connected with their own personal observation and experience."[151] Toward this goal, "My Method," as Pestalozzi called it, prescribed that teachers leverage what would variously be translated into English as students' concrete and particular "sensitive intuitions," "sense perceptions" or "sense impressions" to facilitate their "induction" of abstract, universal academic knowledge.[152]

In order to do this, Pestalozzi developed his "objective teaching method." Drawing on objects familiar to the student and how the student perceived them, the student would be led through oral conversation to generalize by making connections through concrete sense-perceptions. He recommended starting with the simple and only gradually moving on to the complex, such that the student would never be taken out of the realm of what they could

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[145] Green, *The Educational Ideas of Pestalozzi,* Chapter 3. See Monroe, *History of the Pestalozzian movement in the United States*, 42 for a description of Yverdun as an institution.
[146] Pestalozzi, *How Gertrude Teaches Her Children*.
[147] Green, *The Educational Ideas of Pestalozzi*, 16. Similarly, Rousseau in his characterization Émile's education, describes that his tutor was removed from society and dedicated solely to Émile's education for twenty-five years.
[148] Ibid., *The Educational Ideas of Pestalozzi*, 43.
[149] Quoted in Green, *The Educational Ideas of Pestalozzi*, 53.
[150] Johann Heinrich Pestalozzi, "Letter on His Work at Stanz, 1799," in *Great Pedagogical Essays: Plato to Spencer,* ed. Franklin Verzelius Newton Painter (New York: American Book Company, 1905), 363; Green, *The Educational Ideas of Pestalozzi*, 46.
[151] Ibid., 363.
[152] Pestalozzi explains that a sense-perception is "the direct impression produced by the world on our internal and external senses." See Johann Heinrich Pestalozzi, "The Song of the Swan, 1826" in *Great Pedagogical Essays: Plato to Spencer,* ed. Franklin Verzelius Newton Painter (New York: American Book Company, 1905), 366. British art education reformer Ebenezer Cooke explains in his introduction to *How Gertrude Teaches Her Children* that, among English translations of Pestalozzi, "sense-impression" is more representative of Pestalozzi's ideas than "sense intuition," which seems to suggest more fully fledged ideas. Pestalozzi, *How Gertrude Teaches Her Children*, 26.

immediately comprehend. Not only would students learn content better, but they would grow up to be more well-rounded people.

Pestalozzi claimed that through focusing instruction on objects that students were familiar with, he was able to "quickly develop[] in the children a consciousness of hitherto unknown power, and particularly a general sense of beauty and order." The students

> felt their own power, and the tediousness of the ordinary school-tone vanished like a ghost from my rooms… Their tone was not that of learners, it was the tone of unknown powers awakened from sleep; of a heart and mind exalted with the feeling of what these powers could and would lead them to do.[153]

For Pestalozzi, bearing witness to "this self activity" built his conviction that "educative instruction must be drawn out of the children themselves, and be born within them."[154]

Disavowing apriori philosophy, Pestalozzi had declared that "the way of my life is the way of experiments."[155] His methodology for learning about human development echoed the kinds of educational experiences that he recommended for children. Akin to students' induction of abstract knowledge from concrete and familiar particulars, Pestalozzi claimed to develop his "Method" through his close observation of children during his experiences teaching. He claimed himself to be an abnormally emotionally and physically sensitive person, working at "the highest nerve-tension," which assisted him in accruing evidence. He did his best to stay close to the data, and each time his "imagination carried [him] to-day a hundred steps beyond the firm ground which I had found, the next day I retraced those hundred steps."[156]

Even in his firm belief in a careful inductive methodology and disavowal of apriori philosophy, Pestalozzi still felt that "education in all its parts must necessarily be raised to the dignity of a science which must find its foundations in the deepest knowledge of human nature."[157] Whereas early American authors of textbooks for pre-service teachers (David Perkins Page, for example) felt that the teacher should have "*an* ideal" of a well-educated child, Pestalozzi believed that there was *one* set of laws that were the foundation of human development that teachers needed to apply. These laws related to the supposed development of the race, leading Pestalozzi to begin instruction with mimicry and sound-making, followed by hieroglyphics.[158] While he put his faith in the existence of a universal law of development, Pestalozzi also felt that his capacity to apprehend this law was severely limited.[159]

Pestalozzi's comments on whether other teachers could develop knowledge about teaching or not were ambivalent. Barnard notes that one of the advantages of the Pestalozzian method was its embrace of efforts to improve it, which "insured that vivid and interested activity in the teachers which is the first requisite of successful instruction, and has prevented the decay and deadness into which servile followers of exclusive rules much necessarily fall."[160] On the other hand, Pestalozzi felt that teachers should have a limited scope to their investigations and should not experiment with the "doctrines" he had developed even if they were tentative; these were to be applied. Deviations in application were fine if they did not stray from the doctrines, seen as a whole rather than as a set of tips or heuristics.[161] Regardless, Pestalozzi (and his followers)

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[153] Pestalozzi, *How Gertrude Teaches Her Children.* 10.
[154] Ibid., 10.
[155] Green, *The Educational Ideas of Pestalozzi*, 157.
[156] Cited without specific reference in A. Green, *The Educational Ideas of Pestalozzi*, 151.
[157] Green, *The Educational Ideas of Pestalozzi*, 153. Cited from Pestalozzi's New Year's Address of 1818.
[158] Pestalozzi, *How Gertrude Teaches Her Children,* 150.
[159] Green, *The Educational Ideas of Pestalozzi*, 152.
[160] Barnard, *Pestalozzi and Pestalozzianism,* 149.
[161] Green, *The Educational Ideas of Pestalozzi*, 152–156.

accused teachers of ruining his methods by using them in the wrong circumstances, mechanically and without "the spirit that giveth life."[162] Pestalozzi held that "while he has come to the conclusion that while there are many bad methods, there is only one good one."[163]

Even as Pestalozzi worked toward a vision of a singular non-rote teaching methodology, he emphasized that "the *idea* of his method of education should not be confounded with the *form* it might assume" in his own or other teachers' efforts to apply it.[164] As Henry Barnard explains, even Pestalozzi's "own plans and methods under his own application" were not successful; "his institution at Neuhof, was a disastrous failure, in its immediate results, both as a school, and as a pecuniary speculation." His system was furthermore "never fully realized at Stanz, Burgdorf, and Yverdon, but widely diffused by his writings."[165]

Pestalozzi portrayed a romanticized *im*practicality as the definition of good teaching, which is by definition short-lived and perhaps by divine intervention because it is unsustainable. For example, Green describes that Pestalozzi's "exertions were almost superhuman" at his orphanage at Stans.[166] Idealized impracticality was also set in contrast to the orderliness of other schools and classrooms. Pestalozzi's school at Yverdun was an "ill-managed and disorderly institution."[167] Pestalozzi's school at Burgdorf was known for being unclean.[168] He had been variously accused by working class parents, teachers and officials—on account of his "unusually unsystematic" and continual experiments—of "sacrificing the welfare of the children to his investigation."[169] This accusation was even made by his own staff at Yverdun who requested that he maintain the routines and procedures of the school rather than engaging in "his everlasting experiments," endeavoring to "throw all the classes in confusion, thereby utterly destroying the possibility of connected instruction."[170] Explaining his work at Burgdorf, Pestalozzi wrote that his goal had never been "to run a successful boarding-school," but rather that he had wanted to "be in a position to examine, by means of continuous and sufficient experiences, certain ideas relating to the education of mankind." Admitting that his "energies were divided between [his] new discoveries and the fulfillment of [his] duties in respect of the children entrusted to [him]," he noted that it was worthwhile because "[his] method proved its influence upon man's inner nature."[171]

As Pestalozzi told the tale of his dramatic career—and as it was often retold—he emphasized that he was almost entirely alone in his efforts to save the poor children of Switzerland. According to British art education reformer Ebenezer Cooke, Pestalozzi "by his own power alone, absolutely without means or materials, under the most difficult circumstances, with most troublesome children, out of chaos, in a few weeks he evolved order." Indeed, "this success was repeated wherever her alone had free play."[172] This image was despite the presence of his wife,

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[162] Ibid., 159–160.
[163] Cited in Green, *The Educational Ideas of Pestalozzi*, 154-155.
[164] See also Ebenezer Cooke's introduction, which maintains that "By his own work he should be judged, not by the street gossip of Stanz, however much improved; nor by authority and opinion which led even Payne to conclude that he was "incapable of controlling his conceptions"… …"Petty details, unimportant by-matters, and tentative experiments which he had abandoned are overloaded with criticism and comment, while fundamental principles on which he says "everything depends," such as the "prototype," first form, or "pure intuition," are passed by literally without a word. (xliii-xliv).
[165] Barnard, *Pestalozzi and Pestalozzianism,* 11.
[166] Green, *The Educational Ideas of Pestalozzi*, 42.
[167] Barnard, *Pestalozzi and Pestalozzianism,* 147.
[168] Green, *The Educational Ideas of Pestalozzi*, 53.
[169] Pestalozzi, *How Gertrude Teaches Her Children,* 22.
[170] Cited in Green, *The Educational Ideas of Pestalozzi*, 157.
[171] Green, *The Educational Ideas of Pestalozzi*, 157.
[172] Ebenezer Cooke's introduction to Pestalozzi, *How Gertrude Teaches Her Children*, xlvi.

friends who loaned him money, government support and his myriad "assistants," or teachers who worked under him. For example, Pestalozzi found a dedicated support in Hermann Krüsi, who had "the art of the practical schoolmaster" but who was "also intelligent and modest enough to submit himself entirely to the intellectual lead of Pestalozzi."[173] Pestalozzi even relied on his assistants to do the work of writing up his views for him. His assistants worked often with small or no salaries, and generally "resigned to [Pestalozzi] whatever of fame and profit might have come from the manuals they compiled in their respective studies, and the books were published either as by Pestalozzi himself, or as the productions of the institution."[174]

Thirty years after Pestalozzi's death, his story and pedagogical ideals were becoming widely popular through the successes of New York's Oswego Normal School, established by Edward Sheldon. Akin to Pestalozzi, Sheldon cited a concern for the poor as the inspiration for his career in education. After dropping out of law school, Sheldon had been alarmed at the "ignorance and misery of the poor living at Oswego."[175] From there he had started an Orphan and Free School Association to help provide education and shelter, mainly servicing Irish children. Will Seymour Monroe, in accounting for the legacy of Pestalozzi in the United States, would compare Sheldon's empathy for poor children to that of Pestalozzi's.[176] That said, his own autobiography recounts the need to punish students, including striking a student "over the head with the rattan" and another event with "a surly boy" on which he reflected that he had "never whipped so hard in [his] life."[177] This would go strictly against his theorizings as an administrator and teacher educator.

After working as a teacher at his own school for one year, Sheldon became an administrator, taking charge of a private school. Eventually Sheldon became superintendent of schools in Oswego. Sheldon "sensed something amiss in his smooth-running machine" of a district. He felt that "performance was mechanical because motivation was mission; nor did pupils understand the why's of what they learned."[178] In 1859, Sheldon would spot a display of Pestalozzian-inspired tools from London on a trip to Toronto's National Museum. As Dorothy Rogers recounts, Sheldon "became a Pestalozzian on the spot" and "purchased the entire exhibit for three hundred dollars, approximately one-third a year's salary, out of his own pocket." This was despite the fact that the display contained many materials that he could presumably find at home in New York, including "bells, pictures of animals, building blocks, cocoons of silk worms, cotton balls, samples of grain and specimens of pottery and glassware."[179]

Sheldon began developing a teacher education program immediately after his experiences with the Pestalozzian display. He adopted a number of the tenets of Pestalozzianism, including that "education should embrace the united, harmonious development of the *whole being*, the *moral,* the *physical,* and the *intellectual*," with none of these being neglected for another. Sheldon and the Oswego program "assume[d] there is a natural order in the evolution of the human faculties," and that "the perceptive faculties are the first and most strongly developed and upon them are based all future acquirements." The child's characteristic "activity, love of

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[173] Green, *The Educational Ideas of Pestalozzi*, 49.
[174] Barnard, *Pestalozzi and Pestalozzianism,*147. See also Ebenezer Cooke's introduction to Pestalozzi, *How Gertrude Teaches Her Children*, xxxvii.
[175] Monroe, *History of the Pestalozzian Movement in the United States,* 171–172.
[176] "Truly, here was manifested the spirit of Pestalozzi; and how well this account tallies with the latter's labors among the poor and the neglected at Neuhof and Stanz!" Monroe, *The History of the Pestalozzian Movement in the United States*, 174.
[177] Edward Sheldon, *Autobiography of Edward Sheldon,* ed. Mary Sheldon Barnes (New York: Ives-Butler Company, 1911), 83–84.
[178] Rogers, *Oswego,* 5.
[179] Ibid., 6.

sympathy" and "desire for constant variety" should also be kept in mind during teaching.[180] The key to the Sheldon method was "*ideas first*, and language afterward."[181] The child should only be instructed in words if he or she "*feels the necessity for their use, and has the power to apply them.*"[182] As far as discipline goes, Sheldon felt that any discipline was too much;

> repression tends to stultify and deaden the activities of the soul; freedom tends to give growth and vigor. That work is of most value to the pupil which is voluntary, which is done without restraint or compulsion. That teacher who has to resort to forceful methods to secure order or study is of very little value.[183]

As much as Pestalozzi had attempted to develop a Method, Sheldon worked to methodologize it further. Particularly through the help of Margaret E.M. Jones of the London Home and Colonial School, who had come to Oswego as a visiting teacher, Sheldon would promote an interpretation of Pestalozzi's work called *object teaching* as opposed to objective teaching. As Dorothy Rogers explains, "object teaching also developed understanding but aimed chiefly at firsthand knowledge of objects.[184] This was namely to start with an object that children were already familiar with, such as an apple, and exploring its shape, color, and constituent parts."[185] Teachers were to rely less on the use of the textbook, and instruction was given primarily oral.

Sheldon had also arranged some of Pestalozzi's more important emphases into rules that he told teachers to follow in order to avoid rote instruction; for example, to "never tell a child what he can discover for himself. … Activity is the law of childhood. Train the child not merely to listen, but to do. Educate the hand."[186] Additional rules included "first develop the idea and then give the term," as well as "proceed from the simple to the difficult, that is, from the known to the unknown, from the particular to the general, from the concrete to the abstract."[187]

In 1863, Sheldon presented on "object teaching" before the budding National Teachers' Association. At this point, Oswego was already gaining influence and a reputation as the "Mecca" for educators. He provided some points on teachers' common errors in implementing Object Teaching, for example "converting exercises that should be strictly for development, into instruction in abstract science." He felt strongly that the use of any definitions beyond the "actual perceptions of the children" ran the risk of memorization by rote.[188] Another problem was that some, "who have no knowledge of correct principles, and who therefore continually violate them," were taking the program "to mean nothing more than miscellaneous lessons on objects."[189] These "clumsily given" lessons had "led many to condemn the whole system, and thus in certain quarters to bring it into disrepute."[190]

A "serious obstacle lying in the way of the proposed reformation" was "the ignorance of teachers" regarding "the mental, moral and physical constitution of children, and the best method

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[180] E. A. Sheldon, "Object Teaching," in *Proceedings of the National Teachers' Association Afterward the National Education Association From Its Foundation in 1857 to the Close of the Session of 1870,* edited by Henry Barnard (Syracuse: C. W. Bardeen, 1874), 357.
[181] Ibid., 363.
[182] Ibid., 364.
[183] Sheldon, *Autobiography of Edward Austin Sheldon*, 113. Sheldon did not believe in compulsory education.
[184] Rogers, *Oswego*, 20.
[185] Ibid., 9.
[186] Ibid., 20.
[187] Ibid., 20.
[188] Sheldon, "Object Teaching," 357.
[189] Ibid., 358.
[190] Ibid., 358

of bringing this treble nature out in harmonious development."[191] Teachers also had a problematic "disposition to study *methods* rather than *principles."* This was troublesome because

> any proper system of education must be based upon philosophical principles, upon a knowledge of the natural order of development of the being to be educated, in his mental, moral and physical constitution, and the corresponding appliances for promoting such growth; and no one can hope for success who does not clearly comprehend these principles.[192]

Teachers were troublingly avoiding the principles until later, and instead focusing on how to apply the more practice-oriented information available in "models" during instruction. The "only remedy for this evil" was "the establishment of Training Schools for the *professional* education of teachers."[193] Such normal schools would "impart a *practical* knowledge of the science of education and the art of applying it." In this way, teacher educators could "*infuse* right principles into the minds of teachers *[emphasis added].*"[194] Teacher educators would apparently need to turn to the old-fashioned "filling the pail" method of rote instruction to deal with teachers. The infusion would impart the science of education, and the supporting role played by the practice schools, where students would "have abundant opportunity for applying the instruction they receive, and the methods they observe," could supply the art.[195]

Sheldon's respondent, H. B. Wilbur, Superintendent of the New York State Asylum for Idiots, explained that he advocated for the improvement of elementary education and for educational experimentation. However, he did not see the Sheldon program as either, but rather as guilty of a number of theoretical "idols of the cave."[196] He felt that much of the program consisted of information that was already well-known, but the parts that weren't well-known were problematic. He disagreed first that there was "a rational order of development in the course of the sciences," and second that this should be used as a method for common education. In short, he wasn't sure that induction was precisely how sciences or human development occurred. Wilbur also took issue with the idea that every child must rediscover the truths that they are supposed to learn, and that they can't learn anything that they don't discover. He felt that this was not only factually incorrect but gave the teacher an overly passive role in the learning situation. Finally, Wilbur took objection to the emphasis on analysis in the Sheldon method, providing the infamous example of Sissy Jupe from Charles Dickens' "Hard Times." Sissy had lived with horses her whole life, but failing to provide a description of one in her elementary class, is outdone by a boy who describes a horse as

> Quadruped. Graminivorous. Forty teeth, namely: twenty-four grinders, four eye teeth, and twelve incisive. Sheds coat in the Spring; in marshy countries sheds hoofs too. Hoofs hard, but requiring to be shod with iron. Age known by marks in mouth.[197]

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[191] Ibid., 358-359.
[192] Ibid., 359.
[193] Ibid., 359. At this point there were only about ten normal schools.
[194] Ibid., 358.
[195] Ibid., 358-359.
[196] H. B. Wilbur, "Object System of Instruction As Pursued in the Schools of Oswego," in *Proceedings of the National Teachers' Association Afterward the National Education Association From Its Foundation in 1857 to the Close of the Session of 1870,* edited by Henry Barnard (Syracuse: C. W. Bardeen, 1874), 449. Dorothy Rogers helpfully notes that Sheldon had received a "volley of vituperation" from Wilbur in *Oswego,* 8. "Idols of the cave" is a reference to one of the false idols of man (but also used similarly to fallacies) delineated by Francis Bacon, a favorite philosopher of the day. Idols of the cave was in reference to beliefs that obscure reality, particularly from education, books and membership in social groups.
[197] Ibid., 454.

In short, Wilbur was accusing Sheldon of making education rote and meaningless in an attempt to make it less rote and meaningless.

Moreover, Wilbur took issue with the operations of the Sheldon program as "a system of so much pretension" in their assertions that it was "the only correct system for any state of education" and the only way to educational improvement.[198] He took objection both with Sheldon's assertions that there had never previously been a "any system based on sound philosophical principles" and that the Oswego program would *"make teaching a profession*- a title it has yet to earn." According to Wilbur, when anyone "exposes the fallacy of any of the principles" or "the absurdity of any of the methods," the advocates of the Sheldon program would either "repudiate the obnoxious features," "claim that these are but experiments, looking towards something to be perfected," or "fall back upon the quality of their motives."[199] This system, embodying "the light and experience of the best schools of Europe," and providing a "*definite course of elementary instruction* adapted to the philosophic views of the laws of childhood" was overriding any homegrown American knowledge of how to teach developed by teachers. This was both a theoretical and a monetary assault, as a legislative grant had "been obtained… not for experimental purposes, looking towards improvement in elementary instruction, but to train teachers in this particular system."[200]

Responding to the debate, a committee of the National Teachers Association had been formed to vet the program, chaired by NTA president Professor Samuel Stillman Greene. The committee was an illustrious one, including the president of Brown University, the superintendents of schools in Boston, Chicago and all of Connecticut, as well as the principal of the Illinois state normal school.[201] They assessed object teaching favorably, giving its report at the 1865 NTA meeting, followed by a demonstration of a lesson on describing an apple by Oswego master teacher Matilda Cooper. After this, object teaching came to gain considerable influence in the National Teachers' Association.[202] Oswego became not only the "Mecca," but also the "mother of normal schools." This was not only due to its role in training teachers but also because alumni tended to found and staff many other schools.[203]

To conclude, the increase in claims to scientific methodology through "induction" on the part of Pestalozzi and his disciples in the U.S. ironically led them to provide increasingly rote instructions for teachers. This was even as one of the rote recommendations was for teachers to never give rote instruction to students. Pestalozzi's work had drawn a connection between early psychology, a theory of human development, and teaching "principles." His inductive method was both a means of discovering the foundations of human development for experts and what he prescribed for teachers to facilitate for students. While Pestalozzi advised that teachers experiment, this should be within the confines of his recommendations; teachers could not apprehend the foundations of human development on their own, but there was hope that they could apply them.

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[198] Ibid., 450–451.
[199] Ibid., 462
[200] Ibid., 463. Hermann Krüsi Jr., whose father had worked as one of Pestalozzi's assistants, immigrated to the United States and worked at Oswego under Sheldon. Despite this affiliation he rejected Sheldon and Jones's methodology as the acquisition of myriad technical jargon. See Rogers, *Oswego*, 20 & 22.
[201] Monroe, *History of the Pestalozzian Movement in the United States,* 182.
[202] Rogers, *Oswego,* 8–9.
[203] Rogers, *Oswego,* v. In addition to Pestalozzianism and Herbartianism, Oswego also played an important role in U.S. adoption of sloyd and Froebel. Edward Sheldon was inspired to found the Oswego normal school due to the high number of poor and illiterate students in Oswego, which ultimately drove him to look for improved teaching methods. See also Lucas, *Teacher Education in America*, 63 on the importance of the Illinois Normal School in the popularization of Herbartianism.

Pestalozzi's story and the sensitive and embattled persona he portrayed played an important role in constructing the expert as a moral improvement on the average teacher, even if experts enjoyed more privileged social and financial connections. Whereas textbooks on teaching prior to the Civil War had emphasized the need for "governance," now discipline was to be avoided and classroom routines and procedures were either unmentioned or appeared to disappear into the broader category of teachers' propensity to rote instruction and excessive control. Pestalozzi was much too empathetic, in contrast to the current teacher workforce, to demand routines, procedures and discipline of students.

Pestalozzi's self-portrayal repeatedly explained that he could not be constrained by anything procedural or orderly; his life was constructed in contrast to the presumed roteness of teachers. Instead of governance, the empathy and pleasantness of the teacher would draw students into an education in productivity despite ones' material circumstances. Instead of having extensive successful teaching practice, Pestalozzi was purported to have demonstrated an exceptional propensity toward scientific induction during the short experience that he did have. Rather than emerging from (rote) extended experience, knowledge about teaching would spring from the exceptional perceptivity of an expert during short teaching stints.

Employed in the United States context where teachers were increasingly women, the Pestalozzian persona strangely claimed perfect femininity as a male attribute for actual female teachers to fallibly grope at in reality. Indeed, even Pestalozzi's *lack* of "governance;" extending into organization, cleanliness, and desire to actually succeed at teaching students was romanticized. So was his impracticality, as his teaching experiments had a very short lifespan, apparently involved complete self-sacrifice (although not so much that it couldn't be resolved at a resort), and his only enduring affiliation at Yverdun was played out as a disorganized administrator rather than as a teacher. Indeed, Pestalozzi's major success was in writing texts and spreading his story. As normal schools rapidly expanded, Pestalozzi had forged an identity for the rapidly expanding occupation of normal school administrators and teachers. That he was far away in Europe, rarely translated and had also passed away could only have lent to his mystical aura for his American disciples.

As the NTA and educational occupations matured, teacher-expert relationships in the organization became more complicated. Teachers could find common cause with experts in the expansion of public education, both as a means of expanding democracy and as a means of expanding jobs. High-status administrators and academics helped the NTA gain clout on not only the local but also the national level. And yet, teachers—even the generally male and relatively elite high school teachers—also grappled with experts' continual condescension and efforts to exclude teachers in most forms of leadership.[204] In 1870, the NTA merged with the American Normal School Association, the National Association of School Superintendents and the Central College Association to become the National Education Association (NEA).[205] This represented an impressive coordination and cooperation of efforts between experts, namely normal school professors, superintendents, and university professors, despite the inevitable debates over philosophies and jurisdictions. There was little left to indicate that the organization had originated as an initiative by and for "practical teachers."

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[204] Wesley, commissioned NEA historian, conveys the extent to which expert-teacher relationships in the early NEA were complicated through his analytic ambivalence. He teachers' varying gratitude to be in the presence of experts and informal efforts to avoid their lectures through teacher-specific spaces at NEA meetings.

[205] Edgar B. Wesley, *NEA: The First Hundred Years: The Building of the Teaching Profession* (New York: Harper & Brothers Publishers, 1957), 44.

B. Herbart and the Herbartians

The next revolution in progressive pedagogy owed to German psychologist and philosopher Johann Friedrich Herbart. At the Illinois State Normal University, Charles DeGarmo and brothers Charles and Frank McMurry were the major popularizers of Herbartian pedagogy, which they had learned about while getting PhDs in Germany during the 1870s.[206] In the United States, Herbartianism was first and foremost a rejection of faculty psychology which divided the mind into distinct functions and lent a justificatory backing to the theory of mental discipline or mental training. In contrast, Herbartianism promoted an idea of the mind (and body) as operating in unified activity, demanding an education that developed that activity toward students' increased willpower, productivity, and love of learning.

Herbart had very little teaching experience of his own. De Garmo writes that "Herbart's experience as a teacher would seem too small a thing to mention." He had spent two or three years providing private tutoring for a wealthy family in Switzerland. "Yet," De Garmo continues, "to a man who can see an oak tree in an acorn, *i.e.,* who can understand all minds from the study of a few, such an experience may be most fruitful. "[207] While "Pestalozzi was dealing with the unkempt urchins of poverty," Herbart "was in the university instructing the future leaders of thought."[208] For the American normal school principals that Herbart influenced, including DeGarmo, the McMurrys and Colonel Francis Wayland Parker, despite their work in teacher education, their claim to knowledge about teaching did not spring from their respective short teaching stints, but rather from their written works and PhDs acquired in Germany.[209]

Herbart's attentions had been focused largely on the new field of psychology, which he both attempted to establish a foundation for through metaphysics, ethics and mathematics, and hoped could be applied to teaching. After studying under Fichte at Jena and working as a professor in Göttingen, Herbart occupied Kant's chair at Köningsberg starting in 1809, where he would lecture on philosophy but also take lead of efforts in pedagogics, a duty which included establishing a practice school and a seminary for future superintendents.[210] In 1833 he went back to Göttingen, where he worked until his death.[211]

Herbartianism was construed by American Herbartians as an almost inevitable development on Pestalozzi's theorizing. Charles De Garmo, Principal of the Illinois State Normal School, would explain that "whereas Pestalozzi's reform had its sources in the heart rather than in the head," this left something "for Herbart to do; namely, to give scientific precision to instruction and moral training by founding them upon an adequate system of psychology and ethics."[212] Similarly, Herbart built on Pestalozzi's conceptualization of sense-perception and induction with

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[206] For an extensive discussion on the relationship and career paths of De Garmo and the McMurry brothers see Harold B. Dunkel, "Herbartianism Comes to America: Part 1," *History of Education Quarterly* 9, no. 2 (Summer 1969): 202-233. De Garmo and the McMurrys studied under Wilhelm Rein, the foremost Herbartian in Germany at the time.

[207] De Garmo, *Herbart and the Herbartians*, 12.

[208] Ibid., 12.

[209] DeGarmo and Frank McMurry served as principals. They most likely did some work as teachers at some point because this was a common activity for men to support themselves with as they worked on their college degrees. However, I could not find descriptions of their teaching experience. Charles McMurry was known for having more teaching experience and a larger interest in conveying Herbartianism to teachers in his work. He had several teaching posts while attending the University of Michigan during summer sessions. He also spent a year teaching in Colorado and another in California before shipping out to Europe for his PhD. Dunkel, "Herbartianism Comes to America: Part 1." Parker had six years of teaching experience in New Hampshire before moving into administration and had the biggest claim to being teacher-centered (as well as the smallest claim to being a Herbartian and/or scientific).

[210] In Chicago Dewey would parallel these activities of Herbart nearly a century later. De Garmo, *Herbart and the Herbartians*, 18.

[211] Ibid., 21.

[212] Ibid., 4.

a focus on apperception, or understanding.[213] Pestalozzi had defined success in teaching as being based on gentleness, empathy, and starting with what students were familiar with rather than with discipline and routine. Herbart would draw deeper connections between the need to "interest" students in their studies and the development of their moral character.

Akin to Pestalozzi, Herbart emphasized oral instruction over reliance on a text. Instruction should be slow and unhurried and lean on oral recitation (often in concert), writing, drawing, and bodily movements as ways of facilitating comprehension. [214] He sought to not only acknowledge but leverage the fact that the student was not a "blank slate," but rather had pre-existing ideas into which any new ideas must be integrated in order to be understood.

Herbart's course of instruction, based on his theorizing, had five steps for teachers to apply which were variously interpreted by American Herbartians. The first three of which drew on Pestalozzi's methodology. The first step was "preparation," which engaged students' interest by invoking memories of past experiences. The second step was "presentation," which introduced objects or experiences in order to present new material. The third step was "association," through which new knowledge was acquired through its relation to other ideas. The final steps encapsulated Herbart's efforts to build on Pestalozzi's work. The fourth step, "system" and the fifth step, "application," were intended to facilitate the process of students' developing an awareness of their new knowledge and capacity to apply it as a part of their "self-activity" as opposed to in a utilitarian manner.[215]

Herbart saw the five steps as facilitating "apperception," or the process by which new knowledge was assimilated, and "reflection," or "abstraction" by which new knowledge was integrated into prior knowledge. Altogether, Herbart developed Pestalozzi's theory by making the final goal "understanding."[216] According to Herbart's epistemology, the acquisition or understanding of ideas was how the soul could be modified, and through the American interpretation, this was how content learning would facilitate moral development.[217]

Harold B. Dunkel describes American Herbartians as having made "little effort to preserve and transmit the doctrines taken from Herbart and the German Herbartians." Herbart's broader system of philosophy was ignored in favor of his work on pedagogics. German Herbartians had focused on students' intellectual development whereas Americans focused on the moral.[218] However, American Herbartians did follow Herbart in giving little attention to what Herbart referred to (and then dismissed) as "discipline" and "training;" or keeping order in the classroom and the direct action by the teacher on the students' will, respectively.[219]

Whereas prior to the Civil War school men had advocated good school government, and the Pestalozzians had trivialized the need for government in favor of empathy and familiarity, American Herbartians would hold that content instruction *was* the means for establishing the control of the will; in the now and more importantly in the student's future. For Charles

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[213] Ibid., 4. On this point and the "pendulum" of American education reform as represented by Pestalozzi and Herbart, see Monroe, *History of the Pestalozzian Movement in the United States,* 7–8, 18–19, who is quoting William T. Harris.
[214] Ibid., 71–78.
[215] De Garmo, *Herbart and the Herbartians*, 79-80; Rogers, *Oswego*, 11–12.
[216] Harold B. Dunkel, "Herbartianism Comes to America: Part 2," *History of Education Quarterly* 9, no. 3 (Autumn 1969), 378, 382.
[217] De Garmo, *Herbart and the Herbartians*, 30–31.
[218] Dunkel, "Herbartianism Comes to America: Part 2," 378–379, 381. Dunkel provides a detailed analysis of De Garmo's foci in relation to the broader Herbart canon.
[219] Ibid., 378–381.

McMurry, the "*moral character-building aim*" was the "central one in education… like a loadstone, attracting and subordinating all other purposes to itself."[220] For DeGarmo, in

> elementary education our best thinkers unite in the opinion that concrete, interesting matter is far preferable to the dry bones of purely formal and mechanical instruction. In place of the old motto of discipline *and* knowledge, we have really adopted in practice the new one, viz., discipline *through* knowledge.[221]

The development of moral character was now fully in the terrain of pedagogical experts rather than something teachers could bring their particular approach to. Non-Herbartian teaching was characterized as "an almost mechanical action, the sharpening of the mental tools."[222] Mental discipline as mechanical action—and teaching in general—had failed at the development of moral character; as Charles McMurry explains, "a person may be fully equipped with the best that [a training in mental discipline] can give, and still remain a criminal."[223]

McMurray explains that not every child has the innate motivation to learn of Abraham Lincoln, and "it will not do to assume that the average of children have any such original energy or momentum to lead them to scale the heights of even ordinary knowledge." It also would not do "to rely too much upon a forcing process, that is, by means of threats, severity, and discipline, to carry children against their will toward the educational goal." By setting up "interesting aims and desires at every step," the teacher could achieve the educational goal as expressed in this poem:

> "Be not like dumb driven cattle,
> Be a hero in the strife."[224]

For DeGarmo, *"tediousness is the greatest sin of instruction."* Whereas "experience often brings a tediousness that we have to bear," the pupil "should never have to suffer [it] at the hands of the teacher."[225] Any tediousness suffered in childhood could ruin the development of students' *interest*, needed for students to maintain the will to follow through in investigative efforts as an adult. Without the continual challenge to investigation, the man "like the stolid ox plods on, unmindful of all that does not promise to minister directly to physical profit."[226] DeGarmo notes that a good citizen should be attentive to the social economic, and technological forces around him, in order to understand them. "The Macbeths of the mind are those who silence its cry for the knowledge of origin and causes."[227]

The development of interest was key; an interest was "*intrinsic*, native to the subject, and springs up naturally when the mind is brought face to face with something attractive." It should be "steady and persistent," combine "pleasure, facility, and the satisfaction of a need," and avoid feeling "the burden of difficulties."[228] Having an interest would protect students as future adults from idleness, from being a slave to desire and from the at times random circumstances of fate.[229] In this way, it was school content, as it would be envisioned by experts, rather than any teachers' "outward control" in practice that would develop a disciplined citizenry.

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[220] McMurry, *The Elements of General Method Based on the Principles of Herbart* (London: The Macmillan Company, 1905), 7.
[221] De Garmo, *Herbart and the Herbartians*, 244.
[222] McMurry, *The Elements of General Method,* 15.
[223] Ibid., 6.
[224] Ibid., 78–79.
[225] De Garmo, *Herbart and the Herbartians*, 82.
[226] Ibid., 61.
[227] Ibid., 61.
[228] McMurry, *The Elements of General Method*, 86.
[229] De Garmo, *Herbart and the Herbartians*, 59.

In contrast to the Pestalozzian view of making things interesting by being energetic and kind, the Herbartian approach was to rearrange the curriculum such that what experts felt were the most conceptually interesting things were being taught and in the most interesting arrangement. This particular issue was referred to as the "correlation of studies," and would not become a major area of debate in the United States until the mid 1890s.[230] The correlation of studies was based on the idea that school subjects should not be isolated but rather centered around major themes, such that students could develop a "long-abiding interest rather than a transitory one."[231] The subject-matter would need to be selected, arranged, articulated and presented in strict accordance with the stores and processes of the children's minds."[232] In this way, morality and character development would be gained through the morals contained in school subjects, as long as they were taught correctly.

Herbartian theory dictated that new ideas be related to old and be appropriate for children's minds at a particular age.[233] Akin to Pestalozzi's approach, ascertaining what students could learn at any time required the doctrine of recapitulation and "cultural epochs." According to this white supremacist theory, there was a parallel between individual development and the development of the race on the trajectory toward civilization.[234] For example, for the fourth to fifth grades in the United States, De Garmo recommends the *age of pioneers*—"the first to build cabins and take possession of the land that was still claimed by red men and still covered with forests" —as the historical subject around which the rest of the curriculum could be organized. The moral goal for the curriculum was an understanding of the "moral strength and superiority" of pioneers.[235] The activities of indigenous people were viewed as appropriate for the very youngest grades.

In addition to being trained based on their age in relation to the supposed history of civilization, American Herbartians believed, akin to the Pestalozzian perspective, that children needed to be trained for their likely occupation. As De Garmo explains, "a child not trained for the social and economic environment in which he must live is by no means rightly educated." In contrast, "education must fit for living, all along the line, and the better it is adapted to this end the more the people will cherish and promote it."[236] Formality and abstraction in education was the direct result of education being focused on something different than the child's eventual station. This classical training was useful for those "whose future callings are largely introspective in character, such as the preacher, the teacher, the statesman, and even the physician." For "practical men," the irrelevance of this form of training had long led to "instinctive hostility."[237]

Akin to Herbartian's development of understanding on top of Pestalozzi's inductive method of pedagogy, Herbartians sought to build philosophical direction into the Pestalozzian inductive method of scientific enterprise. Herbart was perceived as contributing a firmer theoretical foundation for the science of pedagogy. As De Garmo describes, Herbart's "treatment is comparable in kind to that of the modern astronomer, bacteriologist, psycho-physicist, or evolutionist; it is creative work."[238]

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[230] Cruikshank, "The rise and fall of American Herbartianism," 149.
[231] De Garmo, *Herbart and the Herbartians*, 58-59.
[232] Ibid., 58.
[233] Hiner, "Herbartians, History and Moral Education," *The School Review* 79, no. 4 (August, 1971): 591.
[234] Ibid., 591.
[235] De Garmo, *Herbart and the Herbartians*, 210-213.
[236] Ibid., 250.
[237] Ibid., 234.
[238] De Garmo, *Herbart and the Herbartians*, 10-11.

In addition to providing simplicity, the work of pedagogical "science" was to find a "central organizing principle which shall dictate for the teacher and pupil the highway over which they shall travel together." In this search, "not even the traditional prejudices of the great body of teachers should stand in the way of setting up the noblest ideal of education." The ones who would establish this noblest ideal, the "educational thinkers," "are in duty to free themselves from utilitarian notions and narrowness, and to adopt the best platform that children by natural birthright can stand upon."[239] Experts would intervene on teachers on behalf of the students.

Addressing goals for teachers in relation to Herbartianism, Charles McMurry explains in contrast that

> It is not however our purpose to give an original solution to this problem and to those which follow it. We must decline to attempt a philosophical inquiry into fundamental principles and their origin. Ours is the humbler task of explaining and applying principles already worked out by others; that is, to give the results of Herbartian pedagogy as applied to our schools.[240]

DeGarmo warns against "the empiricist in education," seeming to point to both teachers in general and those who were still operating wholly on a Pestalozzian, inductive basis. The empiricist would "assume a number of empirically derived principles, and then construct from them a system, which, though perhaps architecturally symmetrical, is in reality only a series of happy juxtapositions." In contrast the philosopher would seek, "through analyses of the act of learning, and the nature of mind in general to construct a system of instruction which shall be truly *organic*, in which each step presupposes the preceding and necessitates the following."[241] "Organic" now seemed to refer to a logical flow, in contrast to the Pestalozzian approach where a natural approach meant staying close to sense perceptions in the act of induction. While the empiricist "seeks tried and approved receipts for educational processes, the philosopher is more concerned to build up from central truths a self-consistent body of educational doctrine." Rather than being consistent with the data of teaching practice, educational doctrine would need to be first and foremost consistent with itself, a philosophical problem.

These criticisms occurred in the context of increasing criticism of increasingly female teachers by teacher educators and other educational experts. An 1875 address to the American Institute of Instruction by A. D. Mayo described that achieving educational goals was impossible given the "current army of incompetent teachers" who turned even the best of plans into routine. Success hinged on increasing teacher professionality through a science of education based on immutable principles.[242] Experts admonished teachers to improve their reading habits, or rather their habit of consuming educational journals, and attending summer institutes. This was despite the fact that journals had little to say on actual teaching. While teachers would occasionally rebut the accusations and demands of education experts, they more frequently wrote into journals in order to apologetically make requests for suggestions and corrections.[243]

In general, teachers were increasingly unable to escape the reputation for being "routine" and "mechanical." They were presumed to be traditionalists chugging along by rote. DeGarmo explains that "there is a widespread and often just complaint that teachers, even those from

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[239] McMurry, *The Elements of General Method,* 14.
[240] Charles McMurry, *The Elements of General Method Based on the Principles of Herbart* (Bloomington, IL: Public-School Publishing Company, 1892), 17. This paragraph was taken out of the subsequent edition of McMurry's Elements that I have taken the other quotes from this chapter from.
[241] Ibid., 80.
[242] Cruikshank, "The rise and fall of American Herbartianism," 53–58, 76–77.
[243] Ibid., Chapter 2.

Normal schools, are frequently mere copyists- mere mechanical imitators of that which itself may have been but a mechanical imitation." Teachers were only receiving "half-education and an almost entire neglect of the study of the psychical processes of learning."[244]

Even in the case that teachers were recognized for attempting progressive methods, they were accused of turning even the best methodologies into rote instruction. In his manual for teachers, McMurray explains that "the numerous body of teachers… easily drift into mechanical methods." It was "easy to understand why," seeing as mechanical and formal methods were "comparatively easy and humdrum and keep pupils busy." In contrast, "real studies, if taught with any sort of fitness, require energy, interest, and versatility, besides much outside work in preparing materials."[245] From the most empathetic possible standpoint taken by non-teaching experts, excluding claims that teachers were incapable of knowing about their work or cruel drill-masters by nature, maybe teachers were just too lazy and dull to do "real studies."

Progressive methodologies themselves, however, were becoming increasingly rote, as represented by the widespread Herbartian 5 step method. Dorothy Rogers, in her account of the Oswego Normal, explains that McMurry's *General Method* was followed "as slavishly in many classrooms as object teaching ever was."[246] The increasing aggravation at book-driven instruction among education experts was ironically driving their practice of delivering more book instruction to teachers. Their desire to alleviate students from rules and formalisms drove their practice of demanding that teachers accept rules and formalisms… or accept that they were bad teachers. And indeed, even if they did accept the rules and formalisms, they were still a mere part of the "current army of incompetent teachers" fighting against their innate entropy toward rote instruction.

Despite the tendency to presume the incompetence of anyone who was a practicing teacher, normal schools continued to offer a relatively practice-based form of teacher training–rather than a theoretical one—through the inclusion of model and practice schools.[247] This included Oswego and the Illinois State Normal University. Even as the existence of practice schools in and of itself promoted the importance of experience in teaching and its relevance to normal school instruction, practice schools also facilitated the division of the conception of teaching from its execution. The goals and ideals of teaching were increasingly constructed as a theoretical issue for normal school principals to discuss amongst themselves, whereas teachers should be practicing the application of rules deductively derived from these discussions.

Despite the criticisms leveled at teachers, normals offered relative academic prestige, as well as space for teachers-in-training to experiment and connect with other teachers-in-training. For female teachers, who were now the overwhelming majority of common school teachers, there was the opportunity to acquire independent income and geographical freedom. Indeed, as teachers were more obviously female and experts were more obviously men, this allowed for a spirit de corps for female teachers against the removed professionalism of male experts and high school teachers.[248]

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[244] Charles De Garmo, "Glimpses at German Pedagogy: A Philosophic Basis for Order In Instruction," *Illinois School Journal* 6, no. 4 (December, 1886): 80-81.
[245] McMurry, *The Elements of General Method,* 76.
[246] Rogers, *Oswego,* 102.
[247] Rogers, *Oswego*, 18.
[248] Cruikshank, "The rise and fall of American Herbartianism," Chapter 2.

At Cook County Normal School, Colonel Francis Parker earned a reputation for fostering an experimental attitude amongst teachers.[249] While not a Herbartian per se, he had done a PhD in Germany, instructed teachers in object teaching and felt that moral training should be the goal of education. Parker advocated that teachers make their classes pleasant and teach from their senses rather than from textbooks. He took a firm stance against rote instruction and the memorization of definitions, rules and processes.[250] He included a chapter on School Government in his *Notes of Talks on Teaching*, but it does not discuss discipline or classroom management methods. Instead, Parker explains that activities that are adapted to the child will secure their attention; "the attractiveness of the subject, if naturally taught, will create a genuine enthusiastic love for study, and develop the closest and most prolonged attention, thus making the will of the teacher a secondary and subordinate element in school government."[251] The child would "learn to do by doing; for the pleasure of doing and its resultant successes best fits a man to control himself."[252]

Drawing from Pestalozzi's persona and establishing the ground on which John Dewey would later stand, Parker drew on Herbartian concepts of moral character and correlation, but was reputed as putting the child radically at the center of instruction.[253] Despite his German PhD, Parker was generally judged as "essentially an artist rather than a theorist."[254] Even as Parker drew from Pestalozzi, Fröebel and Herbart to develop an American version of scientific pedagogy, his progressivism has been described as drawing primarily from his natural instincts.[255] Parker's theory was relatively practice-driven, and the Cook County Normal's practice school was the public school for the neighborhood.[256]

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[249] Parker also implemented progressive methods in his capacity as superintendent of Quincy schools. He became principal of Cook County Normal School in 1883.

[250] For an extended discussion of Parker, see Cremin, *The Transformation of the School*, 128–136; Cruikshank, "The rise and fall of American Herbartianism," Chapter 4: The conflict of Philosopher and Pedagogue, 112–142.

[251] Francis W. Parker and Lelia E. Patridge, *Notes of Talks on Teaching Given by Francis W. Parker at the Martha's Vineyard Summer Institute July 17 to August 19, 1882* (New York: E. L. Kellogg & Co., 1883), 161. See Cremin, *The Transformation of the School*, 128–136 on Parker.

[252] Ibid., 163..

[253] While Parker would rarely get credit for it, he developed many of the ideas that Dewey would later be famous for, such as the school as an "embryonic democracy," and "natural" education as an antidote to "machine education."

[254] Cremin, *The Transformation of the School*, 134 who describes that "Parker produced a synthesis that marked a transition from early American transcendentalism to a newer scientific pedagogy, and from dependence on European formulations to a more indigenous effort." See Cruikshank, "The rise and fall of American Herbartianism," 142 for a discussion on how Parker referred to his already humbly-named *Notes of Talks on Teaching* as a "souvenir of an enjoyable summer institute" rather than as a treatise on the science of pedagogy.

[255] See Kliebard, *The Struggle for the American Curriculum*, 36–37 on how Parker's progressivism was supposedly by instinct, particularly in relation to psychologist G. Stanley Hall, whose progressivism was by science. See Parker's commentary in "Second Day's Proceedings," *The Addresses and Journal of Proceedings of the National Education Association, Session of the Year 1880, at Chautauqua, New York* (Salem, Ohio: Allan K. Tatem, 1880), 49 as an example of attacks on his method that are revealing of how it supposedly differed from a more scientific approach. Parker explains that; "It is claimed I stole all my ideas. The thing I commend in that charge is that it is solid truth. I did steal-stole it all. I stole from Cleveland, Cincinnati, Aristotle, Pestalozzi, Spencer, and everybody else I could find in possession of anything worth stealing. I am going to keep at it, and I advise all of you who are earnest teachers to steal-steal all you can; and then you will not get half enough for the famishing minds of children." The idea of teachers "stealing" is still advocated amongst teachers themselves through variations of "good teachers steal and steal often." This points to a tension between conceptualizations of property between teaching and academic culture.

[256] See Gitlin, "Gender and Professionalization," 584 for a discussion on the practice-centricity of the Cook County Normal School. Michael Knoll, "John Dewey as administrator: the inglorious end of the Laboratory School in Chicago," *Journal of Curriculum Studies* 47, no. 2 (2015), 27 backs the claim that Parker's system did not see student-centricity and teacher practice-centricity at odds with each other. Within the context of Dewey's takeover of the Parker School in the Spring of 1903, Dewey explained to Parker School faculty that "first and foremost, the school for teachers had to become a school for students." Two teachers at the Parker School (Baber and Rice) explained that "Under Parker…subject teaching had never been neglected, teacher training never exaggerated, child welfare never violated. Dewey, Baber claimed, harked back to dualistic thinking if he meant that a 'school could not be planned properly for teachers which was not planned to be an ideal condition for children.'"

Parker's ideas were relatively popular among teachers and treated as theory despite his reputation as being insufficiently theoretical amongst other educationists.[257] This was most likely because he advocated for teachers' freedom, indicating a belief that teachers may have some capacity to teach. However, Parker specifically advocated for the teacher to have the freedom to center instruction on the child:

> Perfect freedom should be given the teacher to do the best work in her own way. That is, the highest good of the child should be the sole aim of the teacher, without the slightest regard for false standards. The teacher who strives for examinations and promotions, can never really teach. The only true motive that should govern the teacher, must spring from the truth, found in the nature of the child's mind and the subject taught.[258]

In the case that the school committee stands in the way of the teachers' freedom to advance the child's growth, Parker advocated that the teacher "take your life in your hand and say, turn me out if you will, here I stand for children's rights." Teachers were too much of "a servile set, thinking too much of our bread and butter." Teachers and administrators alike should work for their own freedom to be "artisans" and "artists."[259]

Parker voiced his concerns over methods, and that teachers should be able to go their own way, as long as they "*move*" and "do nothing alike twice."[260] That said, and even despite his concern about the role of methods in teacher education, Parker also established "rules" for instruction based in German methods, and in order to make sure the teacher "moved" in a child-centric manner. Teachers needed to demand the freedom to advance the child, but this was in ways specifically prescribed by Parker. These rules included "never do anything for children that they can do for themselves," and "never tell them anything that they can discover." For the teacher not to obey these rules was to "deprive[] the learner of mental activity," which would thus also deprive the student of knowledge and a moral training.[261] Even as Parker advocated for the value of teacher experience, this was based in teachers' experience at applying his own principles (on behalf of the child), not on teachers building their own conclusions from experience.[262]

To conclude this section, the importation of Pestalozzian and Herbartian pedagogies by education experts was leveraged to legitimate non-teaching jobs with claims to know more about teaching than teachers themselves. Normal school principals and other experts in education drew on implicit and explicit ideas about the deficiencies of teachers in their appeals to a science of pedagogy. In the importation of Pestalozzianism, American experts drew on the idea of a "sensitive" persona who could charitably induct scientific principles from the child. This was in contrast to the idea of teachers who were task-masters, disciplinarians, and lacked knowledge of the children they were working with. The variety of ways in which teachers could fail were increasingly falling under the header of "rote," as discipline was reconstructed as a part of the curriculum, and allusions to classroom routines and procedures evaporated from the science of pedagogy. In the importation of Herbartianism, American experts drew on the idea of creative,

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[257] Cruikshank, "The rise and fall of American Herbartianism," 150–152.
[258] Parker, *Notes*, 154. Quoted in Cruikshank, "The rise and fall of American Herbartianism," 152.
[259] Parker's commentary on W. H. Payne, "The Domain of Nature and of Art in the Process of Instruction," *The Addresses and Journal of Proceedings of the National Education Association, Session of the Year 1880, at Chautauqua, New York* (Salem, Ohio: Allan K. Tatem, 1880), 50
[260] Ibid., 50.
[261] Parker, "The Schoolroom a Workshop," 32. Quoted in Cruikshank, "The rise and fall of American Herbartianism," 130.
[262] Gitlin, "Gender and Professionalization," 594–595.

philosophical rationality in contrast to "empirical" teachers who had to draw on day-to-day facts in ways that would influence their day-to-day work.

In turn, models of student thinking as inductive and understanding, in emulation of inductive and philosophical expert thinking, were shaped in contrast to the imagined teacher. Taken together, drawing from what students already know and building toward deeper understanding would serve as tenets of a science of pedagogy. In turn, the new tenets of the science of pedagogy formed an image or persona for the educational expert that justified their expertise in teaching despite not being teachers. In the lineage of Pestalozzi, experts were more charitable than teachers and had a unique capacity to sense the needs of children. In the linage of Herbart, experts were more rational than teachers and capable of developing foundational understandings of educational phenomena. Non-teaching experts in teaching were able to embody the image of Pestalozzi and Herbart by nature of having earned a PhD and secured time to read, write and discuss by nature of their jobs as experts. Short teaching experiences could be useful in understanding teaching, but only in the case that the individual was reportedly dramatically more astute and philosophically minded than the "current army of incompetent teachers," meaning that they had stopped teaching.

Whereas in the antebellum period, David Perkins Page had described that a teacher should have *an* ideal of what they were working toward, Pestalozzian pedagogy asserted that *one* ideal existed, even though it was hard if not impossible to ascertain. Herbartian pedagogy not only asserted that one ideal existed, but additionally that pedagogical experts were understanding it and repackaging its implications into rules for teachers to learn by rote. As education experts seemed to gain ground in the search to find an ideal, teachers correspondingly seemed to lose any right to having learned something from their teaching that would have some influence on what teaching was about and what its ends should be.

In this context, teachers were drawn into the broader manual training and professional education of which they were supposed to be the major agents. Teachers and working class students alike were supposed to be *interested* in their work (as opposed to merely doing work in exchange for money or marks) in emulation of the self-portrayal of new expert groups, even as they were held to have no capacity to comprehend their own work. Concerns over inadequate pay and benefits were a mere distraction from being an interested, productive and moral contributor to an occupation.

In turn, the removal of teachers from having a right to know about their own work was achieved institutionally in the conversion of the NTA to the National Education Association. In 1870, the NTA merged with the American Normal School Association, the National Association of School Superintendents and the Central College Association to become the National Education Association (NEA).[263] This represented an impressive coordination and cooperation of efforts between experts, namely normal school professors, superintendents, and university professors, despite the inevitable debates over philosophies and jurisdictions. There was little left to indicate that the organization had originated as an initiative by and for "practical teachers."

3. A University Science of Pedagogy

With the development of chairs and then schools of education, the science of pedagogy was developed in such a way that the experience of teachers was made wholly irrelevant to knowing about teaching. This was in part a continuation of the philosophical process already initiated by

[263] Edgar B. Wesley, *NEA: The First Hundred Years: The Building of the Teaching Profession* (New York: Harper & Brothers Publishers, 1957), 44.

normal schools in which increasing "child centered"-ness was achieved through theorizing that de-emphasized the role of the teacher and the "formal" curriculum. Simultaneously, professors in emerging schools of education claimed that they were building an increasingly philosophical, and thus better, understanding of education by eschewing the distracting details of the "empiric." Professors in the new fields of child study and empirical psychology more generally claimed that they could get better data about children away from the distractions of classroom activity, in abstracted surveys and interviews.

The dual efforts of universities to expand their influence on the K-12 system and to secure the market of training for the newly demanded high school teaching force led to an increasing interest in university-based high school teacher training. In acknowledging that even high school teaching had little about it to attract college graduates, educationists focused not on changing unprofessional aspects of teaching like low pay and a grueling schedule, but rather on adding professional aspects, namely "scientific" graduate education.[264] That said, high school teaching still enjoyed large status and pay advantages over working in the common schools.

Normal schools were increasingly deemed an undesirable location for offering graduate education for future high school teachers. They primarily trained female common schoolteachers and students from working class backgrounds, whereas high school teachers were still seen as more elite and as having a stronger affiliation with higher education. Akin to normal schools' complaints about teachers, university professors complained that normal schools focused too much on rote instruction in teaching methods. And yet normal school teaching had become an important career option for men, and so the effort to locate high school teacher training at the university level did not occur without a battle. However, by 1890, several universities had made the leap to including at the least a chair of pedagogy and sometimes a department of pedagogy, for example University of Michigan, Cornell, and NYU.[265]

Arguably the first university professor of education in the U.S., Professor William H. Payne, was hired in 1879. Payne had acquired one year of teaching experience in New York before working as a principal, normal school principal, superintendent of schools, and even editor of the *Michigan Journal of Education*. [266] Payne was representative amongst early education in that he did not have a PhD; experience in education administration was the major experience for a university chair of education until PhD programs in education were developed.

Despite his background in the normal schools, as a university professor Payne argued against the extremes of constructivist pedagogy and against normal school training more generally. For Payne, the normal schools deprofessionalized teachers through their emphasis on "mechanical exactness and expertness," rather than "freedom and versatility." Normal schools were training the teacher to be a "machine," and the inclusion of practice schools turned teachers into apprentices. [267] In contrast, Payne emphasized theory, or the principles of a science of education, in both his courses and his writing such that teachers in training could apply the principles on their own. As Arthur Powell describes, Payne believed that "true professions were taught to *do* by *knowing*.[268]

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[264] Powell, *The Uncertain Profession*, 32–33.
[265] Ibid., Chapter 2.
[266] Ibid., 40–41. Labaree, "An uneasy relationship," 295 notes that "historians generally give University of Iowa credit for establishing the first permanent professorship in pedagogy in 1873… but University of Michigan claims this honor for itself with a chair established in 1879."
[267] Ibid., 40–41.
[268] Ibid., 40–41. See Cruikshank, "The rise and fall of American Herbartianism," 254–256 for a discussion of Payne specifically in relation to practice schools. Charles McMurry would accuse Payne of avoiding model schools because he didn't want to have to model teaching in one.

In contrast to the Pestalozzian and Herbartian trends in the normal schools, Payne argued that "the teacher does not play a negative part in the process of education; his active and determining influence is as positive and as manifest as that of the gardener or the chemist."[269] He furthermore held that while the trend was to make study as much like play as possible, "there is no device or art by which work can be transformed into play." The child would obvious "prefer dabbling in soft clay to poring over his sums in fractions… One is play and the other serious labor; but even the child must learn the lesson of toil, even at the sacrifice of his natural inclinations." [270] Payne furthermore felt that not just objects, but language was important to students' ability to learn about abstractions. Normal schools' goal of avoiding language through oral instruction fell short, as speaking was language as well.

In this way, Payne portrayed the constructiveness of his position in contrast to the work of "rote" normals. He advocated instruction exclusively in theory as an alternative to the normals' practice-based curriculum. While future chairs of pedagogy would borrow Payne's self-juxtaposition with normals, they would refute the idea that teachers were an active and positive force in education in their present situation. This shift signals both the development of schools of education and the changing fate of high school teachers in the late 1800s.

The 1880s saw the expansion of chairs of pedagogy in universities across the U.S. in the interest of training high school teachers. This development was discussed extensively in the NEA.[271] While the growth of university chairs of pedagogy certainly threatened the normal schools' prior monopoly over high school teacher training, it was clear that the normal would continue to manage the common school teacher training scene. The normal and the university department of pedagogy would have different purposes.

At the 1880 NEA meeting, renowned women's rights advocate and Professor of Pedagogics at Missouri State University Grace C. Bibb would argue that common school teachers had "neither the means, the leisure, nor the previous culture which will enable them to grasp all the conditions of the problem of education." Instead, common school teachers would need to be put into possession of the results of experience [rather than being] led to attempt the independent application of principles which they are for whatever reason incompetent to grasp."[272] In this way, Bibb sets up the work conditions of being a professor of pedagogics, like "culture," "leisure" and "means," which teachers did not have access to, as the precondition for becoming an expert in pedagogy or even a high school teacher. In contrast to the common school teachers, for future high school teachers and university experts accruing their training in the university, professors could expect "a degree of preparation, a facility, an intellectual penetration and grasp, a psychological knowledge which will enable them to study the Science of Education with a reasonable expectation of mastering its principles and perhaps of making therein independent investigations and generalizations." [273]

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[269] Parker's commentary on W. H. Payne, "The Domain of Nature and of Art in the Process of Instruction," *The Addresses and Journal of Proceedings of the National Education Association, Session of the Year 1880, at Chautauqua, New York* (Salem, Ohio: Allan K. Tatem, 1880), 47.

[270] Ibid., 47.

[271] Wesley, *NEA: The First Hundred Years*.

[272] Grace C. Bibb, "Normal Departments in State Universities," *The Addresses and Journal of Proceedings of the National Education Association, Session of the Year 1880, at Chautauqua, New York.* Second Day's Proceedings. (Salem, Ohio: Allan K. Tatem, 1880), 54.

58. Quoted in Cruikshank, "The rise and fall of American Herbartianism," 207.

[273] Ibid., 58. Quoted in Cruikshank, "The rise and fall of American Herbartianism," 207.

By the late 1880s, future superintendents and principals were expected to participate in advanced training at universities alongside high school teachers.[274] The educational route for experts and the route for high school teachers would soon be separated, and the dependance on Herbartianism facilitated this specialization. Since Herbart related his pedagogical method to his metaphysics and philosophical psychology, Herbartianism provided not only legitimated rules for teachers with claims to a philosophical backing, but also provided a reason why creating rules for teachers required the relatively autonomous efforts of university professors in philosophizing or "pedagogics."[275] Ironically, the Herbartian correlation of studies would gain increasing support in the university in the 1890s, as the specialization of university disciplines was gaining considerable steam.

While psychology had long been considered suspect by normal schools as a cover for anti-religious philosophy, Herbartianism provided a link between the new field of university psychology and pedagogical goals. Already claiming philosophical abilities above and beyond teachers, new chairs of pedagogy would now claim to additionally be more "empirical" through the child study movement that emerged out of Herbartianism.[276] G. Stanley Hall, who had earned the first PhD in psychology and established the first psychology laboratory in the United States, claimed to study children empirically in the abstracted laboratory setting. This contrasted with teachers' supposedly more disorganized "empric" observations in actual classrooms. Despite the apparent dryness of studying children in a laboratory, Hall viewed child study as an exemplary means of making education more child-centered and took up arms against teachers' overly formal rote instruction in schools. Discussions of government and discipline were no longer relevant to the science of pedagogy.

Even so, psychologists who had leveraged education to legitimate their location in the university had concerns about a science of pedagogy that would draw from psychology. In developing child study, G. Stanley Hall saw himself as developing psychology rather than the science of pedagogy, even if he envisioned child study as having pedagogical implications. Psychologist William James viewed the science of pedagogy as hodgepodge "mixture of the "mighty and aspiring generalities" of idealist philosophy and the "puerile concretes" of normal school technique."[277] Josiah Royce, an idealist philosopher who had been chosen to head the faculty committee for developing Harvard's Normal Course by president Charles W. Eliot, noted the difficulty of dealing with pedagogy—which meant dealing with the particulars of particular students—with generalized science. Indeed, teachers needed to deal primarily with what "science abstracts from and ignores," and this meant learning from personal experience. That said, Royce still advocated the university as a location for teacher training because he thought that the new field of psychology could help teachers build a methodological tendency of mind, and a knowledge of ethics could help guide practice.[278] More than informing teachers in information or methods they may need to teach, psychology was needed to make teachers more morally and mentally sound.

Herbartianism also provided an inroads for the broader rallying of social concern in the 1890s. Hiner explains that the Herbartian concept of "morality" provided an inroads for an

[274] Powell, "Speculations on the Early Impact of Schools of Education on Educational Psychology," 409.
[275] Quoted in Cruikshank, "The rise and fall of American Herbartianism," 202.
[276] On the link between Herbartianism and child study via culture-epoch theory via C. C. Van Liew see Dunkel, "Herbartianism Comes to America: Part 1," 220.
[277] Quoted in Powell, "The Uncertain Profession," 43–44.
[278] Powell, *The Uncertain Profession*, 43–44. Also see Lagemann, *An Elusive Science*, 19 for a discussion.

emphasis on teaching children to be social and aware of social problems.[279] It was in this environment that dynamics between Herbartian reformers and advocates for the traditional curriculum famously battled in the NEA.[280] While this debate was revealing of the arrival of a new profession of professors of pedagogy on the university scene, it was also revealing of the complete irrelevance of teachers and their experience in debates over the curriculum.

Normal schools were increasingly experiencing a change of status amidst the development of university education departments. Their commitment to practice both offered an esprit du corps for practicing teachers and a means of keeping teachers out of theorizing. However, as pedagogy moved into the university, normals at large would increasingly be lumped into the "roteness" of teachers.[281] On the one hand, Rogers, in her depiction of Edward Sheldon's Oswego normal school, writes that

> By 1900, almost all the normal had certain features in common—for example, all were pragmatic; they never worshipped at the altar of abstractionism nor lingered on the arid wastes of theory. They always retained whatever practices worked best. They also attached great importance to practice teaching—and consequently to their model or practice schools.[282]

Normal school teachers encouraged teachers to experiment on their own, through their own experience, and to share what they had learned through experience with other teachers. Teachers were encouraged to not only develop an independence of thought from experts in the subjects they were teaching, but from psychological and pedagogical experts as well. However, this independence was rhetorically developed even as teachers in training memorized and applied the Herbartian steps. Even the ability to trust ones' experience in relation to experts ironically required the expert training of normal school teachers. For example, W. A. Clark, in his normal school psychology textbook wrote:

> The principle purpose of this course is to give the student such a knowledge of himself and of the rational control of his own experiences as will secure the integrity of character and efficiency in the affairs of his daily life. Even for normal school students… the essential fact sought to be realized by the instruction is a well-knit manhood and womanhood through a clear knowledge of self."[283]

At the same time, developing teachers was increasingly a smaller and smaller part of the normal schools, which were relatively beholden to the communities that funded them. The demand was increasingly for peoples' colleges with a diversity of programs.

Despite the shift from scientific pedagogy being based in experience teaching to being based in European methods and psychology, the idea that teachers should be *applying* whatever the science of pedagogy happened to be at the time was held constant.[284] Normal schools seemed to embody an extreme form of application by teachers; for example Dewey notes that teachers in kindergartens and manual training schools would often use step-by-step guides to instruction.[285]

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[279] Hiner, "Herbartians, History and Moral Education," 593.
[280] Herbert M. Kliebard, *The Struggle for the American Curriculum: 1893-1958*, 2nd Edition (New York: Routledge, 1995).
[281] On increasing critiques of normal schools and their struggle to survive see Gitlin, ""Gender and Professionalization," 597; Powell, "The Uncertain Profession," 31.
[282] Rogers, *Oswego,* 18.
[283] W. A. Clark, *Syllabus of Psychology: For Normal Schools and Colleges* (Kirksville, Mo.: Author, 1915), 4 (as cited in Gitlin "Gender and Professionalization," 595–596).
[284] But see also Gitlin, *Gender and Professionalism,* 595–596 for normal school statements on the need for teachers in training to develop knowledge of themselves rather than being merely subservient to "pedagogical authorities."
[285] John Dewey, *Democracy and Education* (New York: Free Press, 1944), 58–59.

Normal school theory and practice was also under increasing suspicion as appealing to frivolous means of exciting students that were unconnected to the learning goals at hand.

University-based science of pedagogy would claim to strike a middle between the overly-child-centered approach of the normal and the discipline of the university disciplines. Graduates of new schools of education were increasingly hired as normal school professors, as university men argued that the normal needed to forgo their empiricism in order to gain legitimacy.[286] This exacerbated hierarchical relationships amongst normal school staff, such that professors (men) acted as department chairs and taught classes in theory, whereas tutors (women) taught classes in penmanship, bookkeeping and drawing.[287]

By the first decade of the 1900s, as the new schools of education built up their distinctive academic territory, the pragmatism of William James and John Dewey and the increasing focus on the social in philosophies of knowledge would render Herbart a passing fad. The further development of child study would render Herbartianism's focus on the child not as deep, and his scientific method not as rigorous as what was happening in the work of experimental psychologists.[288] Culture-epoch theory fell out of favor amongst anthropologists.[289] Remaining appeals to teacher experience or practice as had been traditional championed by the normals were abandoned in favor of child-centricity, a philosophy increasingly removed from practice, and experimentation abstracted from the classroom environment. University professors such as Charles Judd of University of Chicago and Alexander Inglis of Harvard explained that extended teaching experience not only failed to be a qualification for graduate school admission but was a disqualification. Considerations of practice and teachers themselves were suspect for a lack of academic capacity.[290] By 1931-32, most education professors had no experience in K-12 teaching.[291]

4. Conclusions

To conclude, the science of education was built on the exclusion of teachers from the possibility of participating in it, just by nature of being teachers. This was a gradual process, where the institutionalization of normal schools and then universities brought the right to claim to know about teaching physically farther and farther away from the access of practicing teachers, particularly those in the common schools. Experts constructed themselves as both more empathetic and rational than teachers by nature of not teaching; indeed this empathy and rationality formed the very intellectual terrain that they would cultivate. In contrast, teachers and then even normal schools were presumed to participate in a tradition of rote.

The science of pedagogy was out of reach for teachers by nature of the fact that they were teachers, and the work conditions that they endured in the country's emergent and massive educational bureaucracy. Indeed, the tenets of progressive pedagogy were formulated out of the interaction between education's liberatory ideal and the realities of working with children in

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[286] For arguments of college men like Payne at University of Michigan, Fellows at Iowa and Stearns at Wisconsin against the practice-centricity of the normal schools see Powell, "Speculations on the Early Impact of Schools of Education on Educational Psychology," 406–412.
[287] Powell, *The Uncertain Profession,* 31; Gitlin, "Gender and Professionalization," 597–598.
[288] Dunkel, *Herbart and Education*, (New York: Random House, 1969), 125–126. Quoted in Cruikshank, "The rise and fall of American Herbartianism," 17.
[289] Hiner, "Herbartians, History and Moral Education," 590.
[290] Gitlin, "Gender and Professionalization," 600. See also Geraldine Jonçich Clifford, "The Formative Years of Schools of Education in America: A Five-Institution Analysis." *American Journal of Education* 94, no. 4 (August 1986),433–434 and Powell, *The Uncertain Profession*, 61.
[291] Clifford and Guthrie, *Ed School*, 94–97.

mass bureaucracies, placing the onus for the negative aspects of this work squarely and exclusively on the teacher's discretion. The ideals of centering the child, avoiding routines, rote and direct discipline, and that teaching required external ideals, were formulated against the actual work of teachers.

Progressive pedagogical ideals served as an infinite point for teachers to attempt to achieve in practice, and for experts to primarily write about. Not only were teachers rote enactors of rote pedagogy in their natural state without the intervention of experts, but they were continually portrayed as destroying the best ideal reforms that emanated from non-teaching experts. Experts' capacity to carry out the sorts of ideals that they elaborated in their texts were rarely if ever examined. The establishment of routines and procedures which are necessary for successful instruction (and are the continual object of experiment for practicing teachers) were either rendered rote or irrelevant to the science of pedagogy. This was not surprising as experts in pedagogy had no need to take part in these aspects of teaching practice.

Early efforts at the science of pedagogy—such as those of Hall, Page, Emerson and Potter—sought to legitimate themselves through appeals to extensive teaching experience, even as they accused teachers of lacking a professional attitude and doing their jobs by rote, only for pay, and with an excess of discipline. The Pestalozzian and Herbartian initiatives imported from Europe drew on claims to teaching experience that were short enough to avoid an appearance of an overly-rote, extended stay in teaching. The Pestalozzian persona promoted a vision of the normal school expert as incredibly empathetic, self-sacrificing, and perceptive in contrast to teachers with more endurance for teaching. Herbartian reforms drew on Pestalozzi but also promoted a vision of the normal school expert as offering a deeper understanding of educational phenomena through a superior intellect. Herbartianism furthermore served as a vehicle for establishing the science of pedagogy as a university study, through which a claim to philosophy, empiricism, and ever-expanding empathy for the child would eclipse the insights of practicing teachers.

The provision for what would ultimately be a *moral* education for teachers was part and parcel to the broader manual training and professional education movements across the latter half of the 1800s, in which teachers were intended to be key agents. Teachers were to generate a less rote population—more moral, productive and less materialistic—through the insights in normal school textbooks and Pestalozzian and Herbartian reforms. The insights of the science of pedagogy rarely recommended more than an anti-rote moral change for teachers as well. Teachers were to be more empathetic of the student, more self-sacrificial, and even derive moral lessons from the study of psychology, rather than gaining skills in actual teaching. However, in the same gesture that teachers were offered the possibility of becoming un-rote, they were portrayed as inevitably rote. In contrast, experts were presumed to be un-rote, creative, productive and enterprising by nature of being non-teaching experts in the normal schools and universities.

Having wholly erased teachers and their experience from the science of pedagogy, researchers would later look to re-absorb insights from experience into the fold. For example, education researchers of the 1990s would rediscover not only the idea that schooling was social but also that it occurred in a classroom. An increased empathy toward "teachers as learners" similarly attempts to reincorporate the teacher in the science of pedagogy. And yet these efforts are woven into the pre-existing primacy of authoritative documents and the promotion of careers in knowing more than teaching.

The next chapter builds on this one by considering John Dewey's development of the progressive pedagogy that was predominating in the normal schools toward the

institutionalization of university schools of education. Dewey's various theories focused centrally on "doing" and 'experience" in an attempt to reconcile the division between the head and hand, or mental and manual work. "Doing" and "experience" were intended to encompass both the mental and manual, and to convey unalienated work directed by community goals. However, in his accounts of doing and experience, Dewey reinscribed the distinction between mental and manual in his juxtaposition between "doing" that was general and productive and "doing something in particular," or rote work. In this way, Dewey had appropriated the productive aspects of work into students' and professors' academic labor, leaving labor that he portrayed as lacking these productive qualities——most notably teaching—as just rote.

Chapter 3:
"Doing" at the University of Chicago

In 1882 John Dewey left for graduate school at Johns Hopkins after teaching high school for two and a half years in Oil City, Pennsylvania, and Charlotte, Vermont. The clientele at Lake View Seminary in Charlotte were glad to see Dewey leave, and he was happy to do it, as he had struggled to manage his classroom. Many years later, Dewey would comment to psychologist William James that "by some sort of instinct, & by the impossibility of my *doing anything in particular*, I was led into philosophy & into '*idealism*' *[emphasis added]*."[1] Ultimately, while working as a university chair of philosophy and pedagogy at the University of Chicago, John Dewey became the father of pedagogical progressivism in the United States. Pedagogical progressivism, which would later be called "constructivism," has inspired generations upon generations of educators dedicated to the expansion of U.S. democracy by improving how teachers teach.[2]

Ironically, Dewey's escape from doing the particular work of teaching and into abstract idealizing in the ivory tower led him to idealize *doing* as a means for students to learn content knowledge. In contrast to rote instruction in decontextualized abstractions, Dewey explained that students should construct their own understandings of content by doing activities that interest them and draw on their experiences outside of school. In contrast to discipline emanating from the authority of the teacher, students should learn self-discipline and engage in democratic relations by doing as a part of a community. In turn, democratic relations in the classroom would enhance democracy outside of the classroom.

And yet, students had long been *doing* something in the Chicago public schools that Dewey would decry, just the same as Dewey was doing something "in particular" as a philosopher. What was the point of drawing distinction between doing that was and doing that wasn't? Dewey's appeal to doing invoked work in a positive way, but only certain kinds of work. Actually doing something is general, constructive, productive, and an occupation for professors and students in the idealized classrooms written about by professors. Doing something in particular, on the other hand, is simply work, and thereby a kind of doing where you don't do much at all. Rather than merely an endearing idiosyncrasy in the history of progressive education, Dewey's oft-noted classroom management foibles and escape from doing teaching "in particular" to idealizing democracy at exclusive institutions—or actually "doing" something—is at the core of progressive pedagogy.

In this chapter I build on the work of feminist scholars and historians of progressive education to reconsider Dewey's writings during his time at the University of Chicago. Even as feminist scholars have leveraged Dewey's pedagogical philosophy as a means of centering relationality and positionality in the construction of knowledge, they have also criticized the ways in which Dewey's conceptualization of doing positions the teacher as passive supporter of

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[1] Jay Martin, *The Education of John Dewey: A Biography* (New York: Columbia University Press, 2003), 53. For additional descriptions of Dewey's teaching experience see George Dykhuizen, *The Life and Mind of John Dewey* (Carbondale and Edwardsville: Southern Illinois University Press, 1973), 21–5; John Ryan, *John Dewey And the High Tide of American Liberalism* (New York: W. W. Norton & Company, 1995), 57–9. Rockefeller first consolidated his monopoly in Oil City.

[2] Colonel Frances Wayland Parker is also cited as the father of progressive pedagogy, even by Dewey himself. Parker developed many of the ideas Dewey would advocate for first, but Dewey's renowned far surpasses his.

the agentic child.[3] Historians of progressive education have contextualized Dewey's work in the efforts of middle class reformers to mitigate against the explosive class relations of industrial capitalism.[4] I build on the ways in which these accounts have emphasized labor and intellectual authority to show that, even though Dewey learned to become a teacher advocate during his academic career, he also legitimated his own work to their detriment.

Dewey's various theorizings have long been upheld as a part of the American democratic ideal, and with good reason. Dewey's theory of democratic education radically centered students' interests and community goals against a tradition of overly formal instruction by rote. His views on educational science have been contrasted to "administrative progressives" such as Edward Thorndike, as he thought that educational experimentation should occur in and through the construction of democratic school communities.[5] Ultimately, as Dewey would turn increasingly to philosophy during his time at Columbia, he offered a more generalized democratic theory positing democracy, supported by improved education and information dissemination, as an alternative to technocracy.[6] Dewey argued as early as 1903 and in a context of "autocracy" by school superintendents that teachers should have regular avenues for giving input within their school settings and districts.[7]

And yet, even though Dewey advocated for the importance of teachers' experience in the school setting and school districts, he was unable to register this same concern as he articulated the relationship between teachers and pedagogical experts through his writings on progressive pedagogy and the role of schools of education. Dewey's early development of the "doing" pedagogical expert and idealized child was set against his construction of the teacher as just doing their work in particular. More generally, as Dewey appropriated the constructiveness of labor into his pragmatist philosophy, he re-envisioned labor as lacking constructiveness. The philosopher who could ascertain means in relation to ends in pragmatist philosophy would come to the aid of workers who could not. In this regard, Dewey was more similar than different than professors advocating administrative progressivism and social efficiency.[8]

While Dewey's distinction between actually doing something and doing something in particular draws from gendered categories of male activity and female passivity, here I emphasize that it is also reflective of and participating in turn of the century class relations. Indeed, this intersection between gender and class is exemplified by the founding and growth of the Chicago Teachers Federation (CTF) of female elementary school teachers. CTF organized themselves not only along lines of gender but along lines of class as well; they were antagonistic to male education experts but also sought solidarity with and the privileges of all-male labor

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[3] Jane Miller, *School for Women* (London: Virago, 1996), 106 (cited in Maher, "John Dewey, Progressive Education, and Feminist Pedagogies"); Valerie Walkerdine, "Femininity as Performance," *Oxford Review of Education*, 15, no. 3 (1989): 267–279 (cited in Frances Maher, "John Dewey, Progressive Education, and Feminist Pedagogies: Issues in Gender and Authority," in *Feminist Engagements: Reading, Resisting, and Revisioning Male Theorists in Education and Cultural Studies*, ed. Kathleen Weiler (New York: Routledge, 2001), 13–32.

[4] For example, Robert, B. Westbrook, "Schools for Industrial Democrats: The Social Origins of John Dewey's Philosophy of Education," *American Journal of Education* 100 (August 1992): 402–407.

[5] Ellen Condliffe Lagemann, "The Plural Worlds of Educational Research, *History of Education Quarterly* 29, no. 2 (Summer, 1989), 185-214; Stephen Tomlinson, "Edward Lee Thorndike and John Dewey on the Science of Education," *Oxford Review of Education*, 23, no. 3 (1997): 365-383.

[6] John Dewey, *The Public and Its Problems* (New York: Henry Holt and Company, 1927). He wrote *The Public and Its Problems* as a rebuttal to Lippmann's popular pro-technocracy treatise. Walter Lippmann, *The Phantom Public* (New York: Harcourt, Brace and Company, 1925).

[7] John Dewey, "Democracy in education," *The Elementary School Teacher* 4, no. 4 (1903): 193–204.

[8] Lawrence A. Cremin, *The Transformation of the School: Progressivism in American Education 1876–1957* (New York: Vintage Books, 1964); Herbert Kliebard, *The Struggle for the American Curriculum;* Diane Ravitch, *Left Back: A Century of Failed School Reforms* (New York: Simon and Schuster, 2000).

unions. Throughout this chapter, I contrast Dewey's "doings" with early Chicago teacher unionism, in particular the famous speech of CTF President Margaret Haley in front of the National Education Association in 1904.[9]

The chapter proceeds as follows. The first section provides background on Dewey's arrival in Chicago. The second section considers how Dewey drew distinction between teachers' and scientists' capacities for knowledge construction, or doing, in his writings early in his tenure at Chicago. The third section discusses the specific role of writing about the child in the construction of the teacher. The fourth section considers how Dewey's formulation of his school on the University of Chicago campus as a "laboratory" for doing depended on its resource-hoarding. The fifth section considers how Dewey's pragmatism appropriates the constructiveness of labor into academic philosophy.

1. "I feel as if I might get something done here"

Dewey arrived in Chicago in 1894 to chair the department of philosophy and pedagogy, where he would remain until 1904. The University of Chicago had been reincorporated in 1890 from its financially failed Baptist predecessor through the leadership of William Rainey Harper and donations from John D. Rockefeller, among others.[10] The new University of Chicago was to be a model–taking the lead from Dewey's alma mater Johns Hopkins—of the new American research university, based in empirical science across disciplines. Universities in the United States had long occupied themselves in transmitting knowledge made in Europe; now they committed to a vision of "constructing" knowledge of their very own.

Dewey and Harper shared a concern for K-12 education and teacher training. Harper envisioned a University of Chicago that was an exclusive, well-funded research university, but also open to a broad student body that would include workers and teachers.[11] State universities generally had a close relationship with teaching, but it was rare amongst private schools like University of Chicago. Under Harper's leadership, University of Chicago hosted a large number of well-attended events for high school teachers, and many University faculty across programs had prior teaching experience. Prior to Dewey's arrival in Chicago, Harper had already hired Julia E. Bulkley and Louis Célestin Monin as education faculty. Indeed, the capacity to train teachers provided a considerable income for the university.[12] Professors either grumbled that graduate courses did not have the kind of "constructive" work required for graduate students to professionalize in their disciplines, or that efforts to increase students' research capacities ignored students' goals of becoming teachers rather than researchers.[13]

Dewey and Harper also agreed that the development of a science of pedagogy would be of key importance for the university.[14] Dewey found resonance between his desire to participate in the forefront of U.S. research and Harper's emphasis on the laboratory as a means of inductive

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[9] Margaret Haley, "Why Teachers Should Organize," *Journal of Education,* LX, no. 13 (September 29, 1904): 215–222. For another example of contrasting the views of the Chicago Teachers Federation to that of experts see Gitlin, "Gender and Professionalization," 588–624.

[10] John W. Boyer, *The University of Chicago: A History* (Chicago: The University of Chicago Press, 2015). See Martin, *The Education of John Dewey*, 175 for Dewey's mixed jealousy and scorn of U of C trustee Charles Ryerson who "was educated in Paris, studied law & 'does' nothing."

[11] Joan Karen Smith, "Ella Flagg Young: portrait of a leader," PhD diss., (University of Iowa, 1976), 79. The openness of University of Chicago would be facilitated by extension and correspondence study.

[12] Ibid, 78; Robert, L. McCaul, "Dewey's Chicago," *The School Review* (Summer 1959): 261–266. On Julia Bulkley's exclusion at University of Chicago, see Kathleen Cruikshank, "In Dewey's Shadow: Julia Bulkley and the University of Chicago Department of Pedagogy, 1895–1900," *History of Education Quarterly*, 38, no. 4 (Winter, 1998), 373–406.

[13] Boyer, *The University of Chicago*, 95.

[14] McCaul, "Dewey's Chicago," 266.

knowledge construction across disciplines.[15] In November 1894, prior to his arrival, Dewey had pitched the idea for a university laboratory school to President Harper as a method of empirically testing his ideas about ethics and psychology. Over dinner they ended up planning an entire department of pedagogy complete with not only the laboratory school but with primary and secondary teacher training programs as well. Dewey would take administrative lead.

Despite these new administrative duties, Dewey was able to continue to write, spanning multiple disciplines, from psychology to education to logic. Indeed, Harper's university allowed Dewey to avoid a taxing teaching load. Drowning out students' complaints, Dewey fought to teach philosophy courses of only six to eight graduate students who were

> relatively picked persons, & fairly homogenously equipped… by pursuing this exclusive policy & allowing Tufts Mead &tc to lick them into shape I feel as if I might *get something done* here, that sowing of seed broadcast had become wearisome— *[emphasis added]*.".[16]

In this way, Dewey would be able to remove himself from the work of doing anything "in particular" —even the practical work of training undergraduates and early graduate students in the canon —in the interest of focusing on "getting something done" by writing.

Dewey's aversion to even the work of training undergraduates stood in contrast with his stated growing sympathies with the working class. As noted by biographer Robert Westbrook, Dewey arrived in Chicago amidst the Pullman strike, giving him pause to reflect on the struggle of workers.[17] President Cleveland had sent in federal troops to help crush the workers' and laymens' rebellion. Dewey cursed the "higher classes," began to identify as a socialist, affiliated himself with Jane Addams's Hull House and felt cognitive dissonance in working at Rockefeller's university. He spent considerable time "slumming" in poor and working class areas of Chicago in the interest of gaining "experience," reporting back to his wife Alice who was on vacation in Europe.[18] And yet, despite these sympathies with workers, Dewey would watch what he said in order to avoid having to join the working class in having working class lives.[19]

Indeed, conflict between capital and labor had been accelerating rapidly for the past decade. Capitalists managed to turn many crafts into industrial jobs under increasing managerial control.[20] Amidst a recession, workers in various Chicago industries were facing reduced salaries and high unemployment. However, labor did not just tolerate the situation or wait for the assistance of wealthy reformers; working class people were getting organized. The Pullman strike represented an impressive solidarity amongst workers from different railroad-related occupations. In 1894 American Railroad Union president Eugene Debs commented

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[15] See David Lindsay Roberts, *American Mathematicians as Educators, 1893-1923* (Boston: Docent Press, 1997), on Chicago's assumption of leadership from Johns Hopkins, and pages 122–128 on Harper and the laboratory method.

[16] Dewey to Alice Dewey, 27 Oct., 25 Sept. and 9 Oct. 1894, files 8 and 9, box 2, SIU-JDP (cited in Cruikshank, "In Dewey's Shadow," 385). Cruikshank explains that Dewey was interested in teaching offerings for future teachers outside of his regular course load "insofar as they produced income."

[17] Robert, B. Westbrook, "Schools for Industrial Democrats: The Social Origins of John Dewey's Philosophy of Education," *American Journal of* Education 100 (August 1992): 402–407.

[18] Martin, "Another Kind of Education," in *The Education of John Dewey*, 158–178.

[19] On Dewey's caution in avoiding discussions of class conflict and the example of fired Chicago professor Bemis, see Westbrook, "Schools for Industrial Democrats."

[20] On the separation of the mental and manual see Harry Braverman, *Labor and Monopoly Capital*: *The Degradation of Work in the Twentieth Century* (New York: Monthly Review Press, 1974).

> 'What can we do for labor?' It is the old, old query repeated all along the centuries, heard wherever a master wielded a whip above the bowed forms of slaves… but [now] our ears are regaled by a more manly query… '*What can labor do for itself?'*[21]

Soon after Dewey started at Chicago, the Chicago Teachers Federation was founded, largely by female elementary school teachers. The same year, William Rainey Harper was appointed to the Chicago Board of Education, much to the dismay of the Chicago Teachers Federation. Harper chaired a business-backed commission to reform the Chicago public schools, which were under fire for an overly rote curriculum. Despite the capacity for teacher training that Harper had assembled at the University of Chicago, he earned a poor reputation amongst teachers due to his efforts to centralize curriculum and pedagogy, increase educational requirements for teachers, deny teachers a salary increase, and promote male teachers above females.[22] CTF worked hard to resist Harper's efforts to further "tie the school district to the tail of the University of Chicago."[23]

The CTF was unique in educational organizing in that it excluded administrators and high school teachers and primarily promoted elementary school (female) teachers' economic interests.[24] CTF leaders Margaret Haley and Catherine Goggin had about 25 years of teaching experience in overcrowded Chicago public schools during a 20 year pay freeze. At the time, elementary and high school teachers had almost no shared identity; high school teachers were required to hold a college degree, made almost double what elementary school teachers did, and tended to be men from higher-class backgrounds then the elementary school teachers.[25]

While Haley in particular had extensive training in progressive pedagogy and took pride in it, the CTF operated primarily in the defensive, focusing on increasing salaries and stalling reform efforts. In contrast to the teacher journals of professional organizations, the *Bulletin* focused on salaries, pensions, and political battles rather than on teaching.[26] Progressive reforms were viewed as following from improved work conditions. The CTF's constitution explained that its primary goal was "to raise the standard of the teaching profession by securing for teachers the conditions essential to the best professional service."[27]

Emphasizing that organizing around economic and professional issues were not mutually exclusive, CTF leader Margaret Haley—in a speech she gave as the first woman to speak on the floor of an NEA annual meeting in 1904—explained that the success of teacher unions and professional organizations are interdependent. On the one hand, pointing to the tendency in educational theory of "enthroning the child" and "displacing the subject matter of knowledge as the centre of educational theory," Haley describes that, "unless the conditions for realizing educational ideals keeps pace with the ideals themselves, the result in educational practice is deterioration." On the other hand, "to have freedom in the conditions without the incentive of the ideal is no less harmful." In achieving this balance, Haley notes that it was therefore "opportune

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[21] Ray Ginger, *The Bending Cross: A Biography of Eugene Victor Debs* (New Brunswick, N.J.: Rutgers University Press, 1949), 155 (cited in Philip Dray, *There is Power in a Union: the Epic Story of Labor in America* (New York: Anchor Books, 2010), 199.
[22] Murphy, *Blackboard Unions*, 25–29.
[23] William Edward Eaton, *The American Federation of Teachers, 1916-1961: A History of the Movement* (Carbondale: Southern Illinois University Press, 1975), 6.
[24] Andrew Gitlin, "Gender and Professionalization," 609.
[25] Kate Rousmaniere, "White Silence: A Racial Biography of Margaret Haley," *Equity and Excellence in Education* 34, no. 2 (September 2001): 12.
[26]Wayne J. Urban, *Why Teachers Organized* (Detroit: Wayne State University Press, 1982), 73.
[27] Robert L. Reid, *Battleground: The Autobiography of Margaret Haley* (Urbana: University of Illinois Press, 1982), xi.

that the occasion for organization in the newer sense… should be coincident with the formulation of the most advanced educational theory in a practical philosophy of pedagogy."[28]

Haley would cite Dewey on a nation-wide lack of "submitting questions of methods of discipline and teaching, and the questions of the curriculum, textbooks, etc., to the discussion of those actually engaged in the work of teaching." For Dewey, every teacher should have "some regular and representative way in which he or she can register judgment upon matters of educational importance, with the assurance that this judgement will somehow affect the school system." Failing that, the school system was not democratic.[29]

Unionizing teachers found a friend in Dewey, in part because progressive teaching practices would require improved working conditions. By the time of Haley's NEA speech in 1904, Dewey had additionally come around to the idea that teachers' working conditions were important and that they could be viewed as intelligent participants in educational decision-making. However, Dewey's allegiance with teachers and teacher's unions was partial and problematic. He would only gradually accommodate a vision of teacher voice into his theorizing on democratic education, and after a foundation of teacher's work as rote or mere "doing in particular" had been firmly established. Even as Dewey claimed that teachers' experience was relevant, it was still subordinate to a "rationalized" science emanating from non-teaching experts. Dewey had appealed to teacher voice enough to secure a general allegiance from teachers, but in ways that prevented teachers' claim to knowing about their work apart from expert guidance. In the next section, I elaborate on some of Dewey's early views on teachers as a-scientific and thus failing to "do," despite their extended day-to-day experience in teaching.

2. "The great army of teachers" versus those who "have the balance of learning and experience"

Early in his tenure at Chicago where he was also administering University of Chicago's brand-new education facilities, Dewey worked to construct a psychology that could inform instruction.[30] In laying out the tenets of such a field and rationalizing the need for it, Dewey also elucidated his views on teachers' collective capacity. For Dewey, the resources available to teachers consisted of "native tact and skill", "experience," "authoritative instruction in methods and devices," and notably not science.[31] Indeed, teaching was still in a "purely empirical and rule-of-thumb stage," that "only psychology and ethics" could save it from. Dewey notes that, in "our eager advocacy of "facts and things" we are apparently forgetting that these are comparatively worthless, either as stored knowledge or for developing power, till they have been subjected to the discriminating and formative energy of the intelligence."[32]

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[28] Haley, "Why Teachers Should Organize," 215. That said, Weiner sees this as at least partially an attempt to appease the NEA, which Haley called a "rotten old institution." See Lois Weiner, *Teacher Unions and Professional Organizations: Re-examining Margaret Haley's Counsel on Councils.* Paper presented at the Annual Meeting of the American Educational Research Association (San Francisco, CA, April 20–24, 1992), 7.

[29] Ibid., 216.

[30] In particular I draw from Dewey's collaboration with James A. McLellan, an established Canadian educationist, on a normal school textbook for teaching math, James A. McLellan and John Dewey, *The Psychology of Number and Its Applications to the Methods of Teaching Arithmetic* (New York: D. Appleton and Company, 1895). Dewey would later reiterate much of the views about psychology, teachers and teaching expressed there in John Dewey, *The Sources of a Science of Education* (Mansfield Centre, CT: Martino Publishing, 2011). See Martin, *The Education of John Dewey,* 186–98 for a description of *The Psychology of Number* and three other papers Dewey worked on at Chicago that "stand out for their excellence and their exemplifications of the way that Dewey thought about everything."

[31] Ibid., 5–11.

[32] Ibid., 2–3.

In this way, Dewey sets up his rejection of teachers' experience as a source of knowledge about education. Teachers' experience with the "facts and things" of practice is framed as not leading to knowledge of practice without the intervention of intelligence, which, as well shall learn later, springs from psychologists. Indeed, the accrual of facts from experience can lead to *reduced* intelligence, as "the work of getting "things" may be carried to such an extent as to burden the mind and check the growth of its higher powers."[33] The capacity to develop insight from teaching would require the more abstract orientation of university professors, to ground the "facts" and experiences of practice. "It will be readily admitted that this tendency to exalt facts unduly may be checked by the study of psychology. Here, in a comparatively abstract science, there *must* be reflection-abstraction and generalization."[34] While Dewey had a reputation for rejecting Taylorism as it came to students' work at school, he embraced it for teachers in his assertion that teachers' rules of thumb and experience should be rejected for university "science."[35]

Dewey argued that teachers should study psychology because it "develops the power of connected thinking and trains to logical habits of mind."[36] Psychology would assist in making teachers' practice reasoned and rational, compared to its current state, which was one "of mere experiment":

> It is possible to make actual practice less a matter of mere experiment and more a matter of reason; to make it contribute directly and economically to a rich and ripe, because rational, experience. And this the educational psychologist attempts to do by indicating in what directions help is likely to be found; by indicating what kind of psychology is likely to help and what is not likely; and, finally, by indicating what valid reasons there are for anticipating any help at all… As to the last point suggested, that psychology *ought* to help the educator, there can be no disagreement.[37]

More specifically, psychology's means of providing help—or introducing reason and rationality—would be in providing an ideal of human character as a normative goal to teach to. Dewey explains that "education is a science, the science of the formation of character." In this way, education is

> essentially an ethical and psychological problem. This problem can be solved only as we know the true nature and destination of man as a rational being, and the rational methods by which the perfection of his nature may be realized.[38]

The appeal to education being an ethical and psychological problem—a problem for university experts—precludes the teacher from being able to have any insight into it. A teacher, while "a trainer of mind, a former of character… an artist above nature, yet in harmony with nature," is also one "who applies the science of education" that is developed elsewhere.[39]

The contrast that Dewey drew between the knowledge of teachers and the knowledge of experts was echoed in his argument for "a distinct division of labor … as regards training in the science and art of education."[40] On the one hand, educational leaders both in teacher training and in school administration would undergo a "higher type of training… undertaken for the most

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[33] Ibid., 2–3.
[34] Ibid., 3.
[35] See Dray, *There is Power in a Union,* 231 for this description of Taylor.
[36] Ibid., 2–3.
[37] Ibid., 2.
[38] Ibid., 3–4.
[39] Ibid., 3–4.
[40] John Dewey, "Pedagogy as a University Discipline," in *John Dewey: The Early Works*, 1882–1898, ed. Jo Ann Boydston (Carbondale: Southern Illinois University Press, 1972), vol. 5, 281–290.

part, if it is to be done in America at all, by universities and to a considerable extent as graduate work." During their training, these leaders would "devote themselves more directly to the work of pedagogical discovery and experimentation."[41] This is because for these leaders "who are mature and have the balance of learning and experience," … "there is no danger of confusion, of premature introduction to a range of truth lying beyond capacity for successful application." Rather,

> Such students are not only capable of initiation into the region of discovery and testing of new truths, but require it; since, as a rule, they seek after this higher type of training just because they are dissatisfied with the existing regime, or their educational environment.[42]

In this way, Dewey frames classroom teachers who do not seek a higher type of training as satisfied with the existing state of education. In contrast to the future experts, the "great army of teachers" would go to schools

> whose function is to supply [them] with the weapons of their calling and direct them as to their use. It must be the province of such schools to give discipline along lines already well established rather than to undertake experiment along new lines. They must, indeed, be awake to the reception of new ideas, but in undertaking the primary preparation of teachers for the school room, it will rarely be advisable to undertake their initiation into ideas or methods not having some guarantee of time or experience back of them."[43]

In effect, Dewey argued for direct instruction for teachers, as experimentation could not be "safely undertaken" without university experts. The idea that teachers needed to "apply" knowledge constructed elsewhere had its ironies when Dewey recommended the opposite; the opportunity to construct knowledge from the particulars of their lives, for children.

The attempt to make teaching less experimental and more based on philosophy also had its ironies in that Dewey was an advocate for experimentalism. Dewey framed teachers' practice as a mere wash of particulars; "empiric" and disorganized without the intelligent scrutiny of philosophers and psychologists. At the same time, the science of education as proposed by Dewey, based on determining "the true nature and destination of man," is not the sort of problem that could be answered through empirical practice. In this way, the science of pedagogy was defined more by who did it than by what constituted scientific practice.[44]

Dewey was very explicit about the need for expert management of the education system at large, and that this expert management should be located in the university, rather than in the public school or normal school. For one, the university provided greater access to the "knowledge which is trying to break through to the secondary and primary systems."[45] The university was also more materially prepared for investigation, eschewing the option of improving conditions in the public schools: "where specialists abound, where investigations are continually in progress, where the laboratory and the library are thoroughly equipped, is, if anywhere, the place where such requirements are met."[46] Moreover, in the U.S. case where coercive centralization of pedagogical expertise was clearly out of the question, science would help establish centralization (or what Dewey would refer to as "co-operation"). This would happen at the universities,

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[41] Ibid., 282.
[42] Ibid., 282.
[43] Ibid., 281.
[44] For a discussion see Larson, *The Rise of Professionalism.*
[45] Ibid., 284.
[46] Ibid., 284.

> the natural centres of educational organization… It is for them to gather together and focus the best of all that emerges in the great variety of present practice, to test it scientifically, to work it out into shape for concrete use, and to issue it to the public educational system with the imprimatur, not of governmental coercion, but of scientific verification. [47]

Without the guidance of experts, the reconstruction of the U.S. education systems would be, akin to teacher practice, overly empirical and "haphazard," " now trying this scheme, now abandoning it for that, without consciousness of the ends to be reached, without utilization of the manifold failures and successes and with all the waste of time, money and human life involved in such change." [48] In contrast, at the university "where psychology and sociology are most systematically pursued, where scientific inquiry is at its height and where methods of work are most fully developed,"… "it may go on with some clear, if flexible, consciousness of the nature of the problem, of the ends to be met." [49] In his way, Dewey prescribes that the economic and political problems be managed by upper-middle class, university-based experts with exclusive claims to scientific knowledge.[50]

Dewey had high hopes for the science of pedagogy in elevating education from the status of just-work to a scientific enterprise.

> Just as a knowledge of mathematics and mechanics has wrought marvelous improvements in all the arts of construction; just as a knowledge of steam and electricity has made a revolution in modes of communication, travel, and transportation of commodities; just as a knowledge of anatomy, physiology, pathology has transformed medicine from empiricism to applied science, so a knowledge of the structure and functions of the human being can alone elevate the school from the position of a mere workshop, a more or less cumbrous, uncertain, and even baneful institution, to that of a vital, certain, and effective instrument in the greatest of all constructions—the building of a free and powerful character.[51]

For the teachers who did not "rationalize' their practice via psychology, "the machine teacher, like the empiric in every profession, thus becomes a stupefying and corrupting influence in his surroundings; he himself becomes a mere tradesman and makes his school a mere machine shop."[52]

However, Dewey's solution was that teachers conduct a machine-like implementation of the university science of pedagogy. With or without Dewey's science of pedagogy, the teacher would be condemned to do something in particular, rather than really "getting something done." This condemnation of teachers as tradesmen was also strange in that Dewey proposed a theory of democracy based on doing, and under the influence of the labor movement that was exploding in Chicago at the time. In contrast to Dewey, Haley does not denounce the "machine teacher," but rather the "factoryizing education" that made the teacher an

> automaton, a mere factory hand, whose duty it is to carry out mechanically and unquestioningly the ideas and order of those clothed with the authority of position and who may or may not know the needs of the children or how to minister to them… the

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[47] Ibid., 282–283.
[48] Ibid., 284.
[49] Ibid., 284.
[50] See for example "Industrial Democracy," in Dray, *There is Power in a Union,* 225–284; Westbrook, *John Dewey and American Democracy*.
[51] McLellan and John Dewey, *The Psychology of Number*, 5.
[52] McLellan and John Dewey, *The Psychology of Number*, 9–10.

> individuality of the teacher and her power of initiative are thus destroyed and the result is courses of study, regulations, and equipment which the teachers have had no voice in.[53]

Early teacher unions emphasized the importance of teachers' experience in actually *doing* teaching, even if they did not reject "scientific teaching" outright. Teacher experience was the basis for the development of teachers' salary schedule based on years worked and the development of teacher's councils—where teachers could meet without the presence of an administrator—by Chicago Teacher Frances Temple. Haley notes in her speech in front of the National Education Association that

> to such [union] organization [teachers] must take not only a reading acquaintance with the best in educational theory and practice, but a practical knowledge of what constitutes scientific teaching. Nor is this all, though it may suffice for the professional equipment of those whose duties are merely supervisory. The classroom teachers in addition must have the ability and skill, given fair conditions, *to do* scientific teaching. More than this, they must know the conditions under which scientific teaching *is possible*..... such are the prerequisites of teachers who would successfully engage in the work of securing better conditions for the children, for themselves, and for the schools through organization *[emphasis added]*.[54]

In this way, Haley puts the capacity for "doing" educational improvement squarely on teachers, rather than on experts and supervisors. While Dewey portrayed teachers as unable to "do", or construct knowledge about their work, Haley explains that teachers are the ones who "do scientific teaching." She furthermore notes that the capacity to "do" good teaching is not merely based on teachers' skill or willingness, but additionally on structural conditions that teachers have the unique capacity to assess. For Dewey, experts gain their capacity to construct knowledge about teaching precisely because they are without distraction from the particulars of any one classroom, or really any classroom at all. For Haley, this work is "merely supervisory," and devoid of doing. In the next section I elaborate on the role of writing and the ideal of the child – apart from teacher practice—in Dewey's comparison of pedagogical experts and teachers through "doing."

3. Teaching "the child" in practice versus in writing

As noted in the previous section, Dewey states that only the sciences of psychology and ethics, which require abstraction and generalization, can take teaching out of its empirical and rule of thumb stage. This abstraction and generality by experts was shaped by not actually "doing" the work that one is speaking about. In contrast, teachers' practice is characterized as resulting in countless particulars that they had no capacity to make sense of.

In this section I discuss how Dewey characterized teachers in general as using their professional discretion to be punitively authoritarian; both in terms of content and classroom management.[55] Issues of discipline were also key to Dewey's vision of teachers as only doing something in particular, as he framed "doing" as facilitating students' learning completely of

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[53] Haley, "Why Teachers Should Organize," 216.
[54] Haley, "Why Teachers Should Organize," 216.
[55] My discussion here will focus on John Dewey, "Interest in Relation to Training of the Will," in *John Dewey: The Early Works*, 1882–1898, ed. Jo Ann Boydston (Carbondale: Southern Illinois University Press, 1972), vol. 1. This piece was viewed as groundbreaking at the time in its focus on students' interest. In focusing on students' interest directly Dewey sought to draw distinction between the school of education approach versus the normal school approach, which he characterizes as "making things interesting" and the traditional academic focus on content without drawing on students' independent interests. The view that teachers were overly punitive was already well-established by Dewey's time of writing.

their own volition rather than due to the managerial control of the teacher. For Dewey, it was relatively easy to achieve this ideal in writing, whereas for teachers, regardless of their engagement in this ideal, their actual practice would always come up short by nature of being grounded in the reality of working with large numbers of children. In attempting to relieve the ideal student of work-a-day doing in particular, Dewey confined the actual teacher to work-a-day doing by job definition.

Dewey did not disagree with educationists of the day who maintained that discipline was the goal of education. However, he argued that the education system, as far as it currently was, depended too much on discipline emanating from the teacher in engaging students. For Dewey, "it is absurd to suppose that a child gets more intellectual or moral discipline when he goes at a matter unwillingly than when he goes at it with complete interest and out of the fullness of his heart."[56] Interests meant that students would be self-disciplined, the only real form of discipline, because "to *realize* an interest means to *do* something, and in the doing resistance is met and must be faced."[57] Dewey explained that teachers should tap into student interests and introduce academic content only in as much as it refined students' activity.

For Dewey, "when the child feels that his work is a task, it is only under compulsion that he gives himself to it. At the least let-up of external pressure we find his attention at once directed to what interests him"[58] Enforced discipline did not provide a real moral training because it did not allow the student to discipline their own will, and furthermore it was ineffective in that "the spontaneous power of the child, his demand for realization of his own impulses, cannot by any possibility be suppressed".[59]

In this way, Dewey shaped the child in the image of the expert; freed by relative comfort to pursue his own interests rather than being absorbed with the immediate relationship between their hour-by-hour labor and the wages they get for it. To be truly doing something, one needed to be guided by their own interests rather than immediate economic return. At the same time, only in the relatively comfortable position of the expert, and in an environment that allows for pursuit of ones' own interests, is this possible as the mainstay of one's activity. Thus, Dewey relegated most people to merely doing something in particular.

This includes the teacher, who Dewey presumed to run the class primarily by force and to not have any "interest" of their own in teaching apart from that. Even the teacher who appeared successful at her job was failing to engage students' true interests and therefore leading students to develop harmful habits:

> If the teacher is skillful and wide-awake, if she is what is termed a good disciplinarian, the child will indeed learn to keep his sense intent in certain ways, but he will also learn to direct the fruitful imagery, which constitutes the value of what is before his senses, in totally other directions. It would not be wholly palatable to have to face the actual psychological condition of the majority of the pupils that leave our schools. We should find this division of attention and the resulting disintegration so great that we might cease teaching in sheer disgust.[60]

Thus, even when teachers appear to be doing their job well by their own and probably the lay public's standards, Dewey argues that they are still unable to produce the moral or disciplined child due to "divided attention." Not only did teachers waste their discretion through harmful

[56] Dewey, "Interest in Relation to Training of the Will," 115.
[57] Ibid. 144.
[58] Ibid., 115.
[59] Ibid., 119.
[60] Ibid., 119–120.

teaching practices, but the best way for them to teach according to Dewey was apparently to exercise less of their discretion, acquiescing to the child's discretion, in practicing "direction by indirection."[61]

To grapple with this problem of divided attention, Dewey prescribed that the teacher continually reassess the child's current interests, defining this as the "teacher's whole duty."

> it is always *today* in [the good] teacher's practice. The teacher must be able to see to what *immediate and proximate use* the child's interest are to be put in order that he may be moving along the desired line, in the desired direction. … this utilizing of interest and habit to make of it something fuller, wider, something more refined and under better control, might be defined as the teacher's whole duty. And the teacher who always utilizes interest will never merely indulge it…. Just how to use interest to secure growth in knowledge and in efficiency is what defines the master teacher. Here is no place to answer.[62]

Indeed, this continual reassessment of each individual students' need was, while easy for Dewey to write about, virtually impossible given the state of Chicago classrooms at the time, where teachers taught in overcrowded classrooms in unsanitary and even dangerous buildings.[63] In this way, Dewey indexes ideals rather than practices for teachers as the science of education. Dewey is able to perfectly employ progressive pedagogy by writing about his own intellectual engagement as an expert rather than by actually facilitating this experience for any classroom of students (declining to even give a suggestion on how).

For Dewey, "the law for presenting and treating material is the law implicit within the child's own nature,"[64] and this nature could only be apprehended through university science, despite the fact that teachers already knew actual, individual children through their experience in dealing with large numbers of them. Despite the fact that the teacher is presupposed to not be successful in correctly leveraging students' interests, this is "the teacher's whole duty," to the exclusion of other parts of their job, like familiarity with families, knowing the content, having a curricular-vision, or setting up routines and procedures for the class.

Dewey emphasizes that teaching that fails to live up to leveraging the individual child's interests is not actually doing anything and may actually be harmful:

> education becomes reduced to a pressure from without. It may, indeed, give certain external results but cannot truly be called educative. Without insight into the psychological structure and activities of the individual, the educative process will, therefore, be haphazard and arbitrary. If it chances to coincide with the child's activity it will get a leverage; if it does not, it will result in friction, or disintegration, or arrest of the child nature.[65]

As Dewey condemns teachers' classroom management as not doing, he also condemns teachers to just classroom management; the work of actually understanding the child and their interests was for educational experts in universities. Experts' non-participation in managing the class gave them space to envision teaching as an exercise of freeing students from the shackles of

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[61] Robert B. Westbrook, *John Dewey and American Democracy* (Ithaca: Cornell University Press, 1991), 107.
[62] Ibid., 143.
[63] In Émile, Rousseau established the progressive ideal situation of one teacher per one student. See Cremin, *The Transformation of the School,* 11. See Murphy, *Blackboard Unions* for work conditions for teachers in Chicago public schools at the turn of the century.
[64] John Dewey, "My Pedagogic Creed," in *John Dewey: The Early Works*, 1882–1898, ed. Jo Ann Boydston (Carbondale: Southern Illinois University Press, 1972), vol. 1, 91.
[65]Dewey, "Interest in Relation to Training of the Will," 85.

teacher authoritarianism. Dewey's portrayal declines to consider the possibility that teachers were already engaged in leveraging students' interests and in developing alternative methods of instilling discipline. Indeed, the degree to which teachers participated in the National Education Association despite their obvious marginalization within it, as well teacher attendance at progressive teacher training institutions seemed to point to this. At the very least, teachers could find in progressive pedagogy an appealing antidote to the administrative progressives' interest in management, which often tied student obedience to teacher obedience.[66]

In contrast to Dewey's portrayal of teacher-student antagonism, Haley describes that,

> there is no possible conflict between the child and the interest of the teacher…for both the child and the teacher freedom is the condition of development. The atmosphere in which it is easiest to teach is the atmosphere in which it is easiest to learn. The same things that are a burden to the teacher are a burden also to the child. The same things which restrict her powers restrict his powers also.[67]

As opposed to the expert vision of teacher wasting their discretion on being overly authoritarian, Haley focuses on the conditions of teaching, which could either be "easy" or burdensome. This reframing in terms of work conditions related to Haley's view of how, rather than being antagonistic, teachers and families' needs were related and expanded beyond the confines of the classroom. The CTF's affiliation with the Chicago Federation of Labor also institutionalized teachers' solidarity with unionized working-class parents.[68]

However, Haley's unionism was tempered by her idea that professionalization was needed as a check on the materialism of unions. Even as CTF pushed back on experts, it was due to experts' failure to acknowledge teachers' working conditions rather than against experts more generally:

> The element of danger in organization for self-protection is the predominance of the selfish motive. In the case of teachers a natural check is placed upon this motive by the necessity for professional organization. The closer the union between these two kinds of organization the fuller and more effective is the activity possible to each.[69]

This despite the fact that the more "professional" members of the National Education Association and education professors in general enjoyed substantially higher salaries than the teachers. Professionalism did not seem to actually put any damper on the profit motive, except when imposed from above. For example, Dewey's biographers note his continual push for salary increases and European vacations for his entire family. In the next section I discuss further Dewey's efforts at developing an oasis for himself and his family. More specifically, Dewey's laboratory school provided an oasis from the Chicago public schools, both for his children and for his educational experimentation.

4. **The laboratory private school versus the un-"controlled" Chicago public schools**

Dewey had a vision of the laboratory school before he even started his job in Chicago, and he saw the laboratory school as the antidote to the problems of the Chicago public school system. In

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[66] See for example William Chandler Bagley, *Classroom Management: Its Principles and Technique* (New York, The Macmillan Company, 1908). See Gitlin, "Gender and Professionalization," for an explanation of the double-bind of professional ideology for teachers. In order to improve their status through professionalization they often had to buy into anti-teacher and sexist viewpoints.

[67] Haley, "Why Teachers Should Organize," 215.

[68] Dorothy Shipps, *School Reform, Corporate Style: Chicago, 1880-2000* (Lawrence: University Press of Kansas, 2006), 31.

[69] Haley, "Why Teachers Should Organize," 215.

the same letter to his wife Alice in which he decried the deplorable condition of Chicago's Public schools, Dewey noted that

> there is an image of a school growing up in my mind all the time; a school where some actual and literal constructive activity shall be the centre and source of the whole thing, and from which the work should be always growing out in two directions—one the social bearings of that constructive industry, the other the contact with nature which supplies it with its materials. I can see, theoretically, how the carpentry etc. in building a model house shall be the centre of a social training on the one side and a scientific on the other, all held within the grasp of a positive concrete physical habit of eye and hand.[70]

Thus, Dewey's school would be centered on doing. Soon after starting his role as head of the laboratory school, Dewey declared that "the work thus far done in Pedagogy in this country has been comparatively useless: it has been mechanical and vague because separated from psychology and social ethics."[71] According to Robert Westbrook, for Dewey the major problem for Chicago schools, rather than relating to issues with funding, "grew out of its foundations in the faulty dualistic epistemology he was attacking in his writings on psychology and logic in the 1890s, and he set out to design a pedagogy grounded in his own functionalism and instrumentalism."[72] The school was an ideal location for testing philosophy because it is "the one form of social life which is abstracted and under control—which is directly experimental, and if philosophy is ever to an experimental science, the construction of a school is its starting point."[73]

The laboratory school would function to make recommendations to the common schools along these lines:

> It is believed that there is nothing which our common schools need more than wise guidance in this respect- the presentation of methods which are the offspring of a sound psychology, and have also been worked out in detail under the crucial tests of experience.[74]

On the one hand, akin to the practice school in the normal school, the laboratory school would keep "theoretical work in touch with the demands of practice", and operate as "the nerve of the whole [school of education] scene"[75] The school would

> test and exhibit in actual working order the results of the theoretical work. Experience has confirmed what might have been expected *a priori*, that pedagogical instruction, whether in universities or normal schools, is effective in proportion as the theory of the classroom is accompanied by actual school work. Only in this way can the student get the real force of what is advanced in the lecture or text-book; only in this way can there be assurance that the teaching of the classroom is not vague and impracticable.[76]

Dewey clarified that this actual school work would not be the "practice" of the normal school. Rather than "practical exercise in the weapons of the calling as to prepare them for the actual work of teaching,"

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[70] Westbrook, *John Dewey and American Democracy*, 96.
[71] Knoll, *John Dewey as Administrator*, 7.
[72] Westbrook, *John Dewey and American Democracy*, 97.
[73] Ibid., 96.
[74] Ibid., 244. See Westbrook, *John Dewey and American Democracy*, 97 on how the school came to be called the "Dewey School" because it was strictly about testing Dewey's hypotheses in functional psychology and democratic ethics.
[75] Westbrook, *John Dewey and American Democracy*, 97.
[76] Dewey, "A Pedagogical Experiment," 288. Cruikshank, "In Dewey's Shadow," 403–404 notes that "although the lab school curriculum bore strong traces of Herbartian influence, any acknowledgement of that influence was conspicuous by its absence." The most obvious influence was Dewey's use of Herbartian "cultural-historical epochs theory" (or recapitulation theory) in informing his occupations.

> "practice" in a university school of practice is a word of enlarged sense. It refers not so much to individual pupils as to the principles which are tested and demonstrated. Such a school is, in the strictest sense, a laboratory.[77]

The Laboratory School of the University of Chicago opened its doors in January 1896, with sixteen children and two teachers.[78] It was certainly "abstracted and under control" in the way that it avoided the broader Chicago scene. Ultimately the student body consisted largely of the children of professional families, and mainly the children of University of Chicago professors.[79] Dewey's four children attended. The school costed $12 for twelve weeks, which Dewey considered to be a "low figure… in order that the school might be in spirit a common school," but given the clientele would serve in reality as a discount for professors.[80] The University of Chicago had provided a one-time grant and salaries for 10 student teaching assistants, but otherwise the school had to secure its running costs itself from fees and donations, akin to a regular private school.[81] Dewey had debated with Harper about where the school should be located, and explained that:

> Harper thought the school ought to be near the University so as to be convenient of access; I told him I wanted it over on the west side, & that I had no desire to have an aristocratic school or to help train the children of the higher classes-, but I can't quite get over the argument of convenience of access myself… It's a great relief to have to deal with a business man, & not a man of culture or a scholar. If the Univ. can be utilized as a means of educating Fred & Evelyn [Dewey's children] Mr Rockefeller's Standard Oil Co would have some justification finally.[82]

Despite the elite and upper middle-class clientele, parents saw their entrance into the pedagogical experiment as a means to help marginalized children through the development of a democratic, rational pedagogy.[83] The specific vision of education for democracy at the Dewey school was workplace democracy, and thus the Dewey School modeled this through having students work at occupations within a community. In the emphasis on occupations Dewey borrowed from the larger manual training movement of education experts and capitalists who hoped that "constructive industry" would train workers for work on the public dollar.[84]

While Dewey drew from the manual training movement in basing instruction in "constructive industry" and in his hopes that it would foster democracy, his view that occupations should serve as a means of teaching content rather than as a means in and of themselves was a divergence.[85] For Dewey, "constructive industry" was a simultaneous social and scientific training for students; students would learn traditional content as a need for it arose in their activity. In the Laboratory School, Dewey reported, "the child comes to school to *do*; to cook, to sew, to work

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[77] Ibid., 288.
[78] Westbrook, *John Dewey and American Democracy*, 97.
[79] Martin, The Education of John Dewey, 179.
[80] John Dewey, "A Pedagogical Experiment," in *John Dewey: The Early Works*, 1882–1898, ed. Jo Ann Boydston (Carbondale: Southern Illinois University Press, 1972), vol. 1, 246.
[81] Knoll, "John Dewey as administrator," 7. While Harper and Dewey were continually at odds about Dewey's activation for university funding for the lab school, Harper did also make strong efforts at fundraising on Dewey's behalf. Harper's son attended the school.
[82] Dewey to Alice Dewey, 5 Aug., 13 and 25 Sept. 1894, files 7 and 8, box 2, SIU-JDP (cited in Cruikshank, "In Dewey's Shadow," 387). See also Martin, *The Education of John Dewey*, 179
[83] McCaul, "Dewey's Chicago," 276.
[84] Robert, B. Westbrook, "Schools for Industrial Democrats." See also Cremin, *The Transformation of the School* for NEA debates about manual training, and union activation against (and later acceptance of) manual training as gutting union apprenticeship programs.
[85] Shipps, *School Reform, Corporate Style,* 21.

with wood and tools in simple constructive acts; within and about these acts cluster the studies—writing, reading, arithmetic, etc." Skills such as reading were developed when children came to recognize their usefulness in solving the problems that confronted them in their occupational activities.[86]

While Dewey appropriated the constructiveness of work into his school, he also "self consciously purified" occupations from the social relations of capitalist production and put them in a cooperative context in which they would have been virtually unrecognizable to those who performed them in the larger society. In the school, he said, "the typical occupations followed are freed from all economic stress. The aim is not the economic value of the products, but the development of social power and insight."[87] Freed from "narrow utilities," occupations in the school were organized so that "method, purpose, understanding shall exist in the consciousness of the one who does the work, that his activity shall have meaning to himself."[88] Dewey meant this as a critique of the "industrial *régime"* that separated the manual and the mental, but at the same time Dewey separated both from actual work conditions and the constraints of working class life.

Scholars have noted that the school "was clearly not designed for social reproduction."[89] Unlike Pestalozzi, for example, who focused on training working class students (like many other education reformers), Dewey "did not think of education in terms of class."[90] However, in this way, the school was well designed for the social reproduction of upper middle class experts. Participating in occupations free of economic stress left students ignorant of the material and social relations that structured occupations. Students engaged in work that they would never otherwise do as a means of gaining an "experience" on which they could reflect toward academic production:

> From occupations, students in Dewey's school proceeded naturally to their correlatives in the so-called disciplines: from production to economics, from cooperation to politics; from experiment to science; from activity in a community to the understanding of other, larger communities through history, social studies, geography, and culture; and from the activities of a civilization to ethics, morals and manners. Wherever Dewey's students entered an occupation, they came out on the other side in interest-saturated reflection. [91]

The school also provided a means of social reproduction for upper middle class intellectuals in that it was created in the image of the university. Dewey emphasized that the school was a democratic community that allowed for "individual self-realization" and "conscious control of your own labor."[92] In this, Dewey echoed Harper's image of the university as a corporation of near-equal (and thus democratic) members in search of truth, and enjoying freedom of thought and expression, even as the school community and its goals were a product of expert design.[93] The claim that this exclusive environment had been stripped of class relations reproduced the

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[86] Westbrook, *John Dewey and American Democracy*, 102. For a discussion on the white supremacist nature of the recapitulation theory on which Dewey based his approach to occupations, see Thomas Fallace, "Repeating the Race Experience: John Dewey and the History Curriculum at the University of Chicago Laboratory School, *Curriculum Inquiry* 39, no. 3 (2009): 381–405

[87] John Dewey, *The School and Society* (Chicago: The University of Chicago Press, 1900), 32.

[88] Ibid., 38.

[89] Westbrook, *John Dewey and American Democracy*, 100.

[90] Martin, The Education of John Dewey, 201. See Daniel Perlstein, "Starting Life Again": School and Community at Arthurdale (U.S. 1934–1936)," in *Pedagogies and Curriculums to (Re)Imagine Public Education*, ed. Encarna Rodríguez (Singapore: Springer, 2015), 81–95 for an argument on the obfuscation of class relations in a Deweyan training for poor children in Arthurdale, West Virginia.

[91] Martin, The Education of John Dewey, 200.

[92] Westbrook, "Schools for Industrial Democrats," 407

[93] William Rainey Harper, *The Trend in Higher Education* (Chicago: The University of Chicago Press, 1905).

university's claim to be democratic, and constituted of scientific experts devoid of class interest and apart from the class relations of monopoly capitalism. However, the school participated in upper-middle class and academic relations with the world outside of the University of Chicago context.

Dewey's vision of teachers as workers was ultimately influenced by his graduate student, Ella Young Flagg, who had resigned from her post as a district Superintendent for the Chicago School district and taken a job at the Laboratory School. Akin to her advocacy for teacher councils in Chicago, through which teachers were purportedly able to influence school and district policy, Ella Flagg Young was able to convince Dewey to offer teachers at the Laboratory School "freedom and intellectual cooperation," rather than "supervision" and "technical training"; that is, to treat them as peers and colleagues." Dewey notes that "it was from [Young] that I learned that respect for freedom means regard for the inquiring or reflective processes of individual [teachers]."[94] At the Dewey School, teachers were able to work cooperatively and meet once a week. However, the mandatory presence of Dewey at meetings meant that teachers would be meeting with expert guidance. After Dewey's initial frustration that the meetings did not seem sufficiently scientific, he was able to influence the proceedings more.

Teachers also had the freedom to apply Dewey's principles to "actual conditions" as they wished, and to use them as "a kind of working hypothesis, in line with his pragmatic vision of knowledge."[95] However, despite the claim that Dewey's principles constituted a hypothesis, there is little evidence that any of Dewey's principles were changed on the basis of his role in administering the laboratory school. Indeed, it is unclear that Dewey *could* change anything about his principles, as they were normative or philosophical statements on what education should be rather than hypotheses on actual states of affairs.[96] Dewey's vision vacillated between the idea of the school as a means for discovering best methods and as a means to put the best methods, which were already known, on display.[97] Because of this, the fact that teachers were *applying* unchanging principles emanating from Dewey was partially obscured by the in-effected insinuation that teachers' practice could reveal some need for hypothesis-revision.

Dewey's administrative duties expanded; he was also made the director of the South Side Academy and the Manual Training School in 1901; the additions of these responsibilities meant that he could now rent two adjoining apartments, own a cottage and employ four personal employees to "do" his housework and childcare for him, as he advocated students' doing housework at school.[98] When Colonel Parker, a competing progressive teacher educator, died in 1902, Parker's responsibilities over the School of Education, along with their two elementary schools, were quickly passed on to Dewey without any dispute. That said, the change of guard did not proceed peacefully; Parker school personnel found Dewey to be disrespectful of the

[94] Ellen Condliffe Lagemann, "Experimenting with Education: John Dewey and Ella Flagg Young at the University of Chicago." *American Journal of Education* (1996): 177. Dewey fueled a considerable amount of inspiration from Young into his publications, see for example Smith, "Ella Flagg Young," 81. Young wrote her dissertation, *Isolation in the Schools*, about teacher councils.

[95] For a discussion from two lab school teachers, see Katherine Camp Mayhew and Anna Camp Edwards, *The Dewey School: The Laboratory School of the University of Chicago 1896*–1903 (New York: D. Appleton-Century Company Inc., 1936), 365–366.

[96] For conflicts between Bulkley and Dewey about whether Dewey had a "general final purpose" for the Dewey school, see Cruikshank, "In Dewey's Shadow," 389–390. Despite his argument with Bulkley, Dewey confessed to lab school employee Clara Mitchell that he did not have a *pedagogical* theory.

[97] Smith, "Ella Flagg Young," 88.

[98] Knoll, "John Dewey as administrator," 9–12.

general approach of the practice school, autocratic, and yet absent. The laboratory school was losing enrollments.[99]

Dewey and his wife Alice eventually resigned from University of Chicago due to a dispute where Harper attempted to mediate between the Deweys and the faculty and teachers at Parker's School of Education. Many of the teachers threatened to resign if Mrs. Dewey was appointed principal, because she was quick to fire teachers and already critical of the practice school. Harper attempted to placate the teachers by telling them Mrs. Dewey would only be appointed for one year, but he did not alert the Deweys. When Mr. and Mrs. Dewey were finally alerted to the fact that her job was temporary, both Deweys resigned from University of Chicago, and Dewey was offered a job at Columbia, starting in 1905.[100] Young also resigned and left for Europe. Under Charles Judd, the laboratory school evolved to focus on drill, dropped the visions of democracy and the laboratory, and took the overt stance that it was, as Woodie T. White puts it, a "prep school for the wealthy and talented."[101]

Both Parker and Dewey's institutions had managed to secure large donations, and rather than fueling these funds toward the improvement of the pre-existing K-12 system in Chicago that taught the poor children toward whom their democratic project was supposedly directed at, they assumed that the problem of the public schools was a personnel problem, and that they could do better themselves. In 1903, the laboratory school had 140 students and a staff of twenty-three teachers and ten graduate students.[102] This was a one to six adult to student ratio without graduate students and a one to four adult to student ratio including graduate students, at a time when Chicago public school teachers were teaching classes of 40 to 60 students. University faculty developed curricular materials for the school, as a part of "Dewey's plan to make education the meeting ground of all specialties."[103]

Indeed, while Dewey's school claimed to be an experiment in democracy, it enacted an experiment in the exact opposite through resource-hoarding. In this way, the insulation of the Dewey School spoke to a broader dynamic of the "laboratory" in the new research university as a controlled interaction with evidence from "the real world."[104] The Dewey School's insulation was precisely what made it a "controlled" experiment in democracy from the perspective of Dewey. Furthermore, even as students were given allowances for experimentation in their school work, the fact that children were the subjects of the democratic experiment by adults echoed the relationship between experts and "the public" in Dewey's broader vision of expert-mediated democracy.

Dewey had achieved a nascent interest in teachers' autonomy and an interest in their work during his time in Chicago, leading up to his own advocacy for teachers' unions. However, his efforts in education that he had developed at the Laboratory School Laboratory School evaporated along with his relationship with Ella Flagg Young when he moved to New York.

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[99] Knoll, "John Dewey as administrator," 23. See Knoll for an exploration of multiple hypotheses for declining enrollments, including parents' realization that continued donations would be very expensive, a lack of discipline and concern for academics at the school, problems with Alice as principal,

[100] See Westbrook, *John Dewey and American Democracy*, 111. See Knoll, "John Dewey as administrator," 27 for Ella Flagg Young's role in stoking the fears of Parker school faculty.

[101] White, Woodie T. "The Decline of the Classroom and the Chicago Study of Education, 1909–1929," *American Journal of Education* 90, no. 2 (February 1982): 149.

[102] Westbrook, *John Dewey and American Democracy*, 97.

[103] White, "The Decline of the Classroom and the Chicago Study of Education," 147. White gives a list of well-known scholars in the sciences, including one Nobel Prize winner.

[104] See Westbrook, *John Dewey and American Democracy*, 110 for a commentary on Dewey's underestimation of the role of the school's insulation from Chicago in its success. See Gitlin, "Gender and Professionalization," on normal schools' financial struggles at the time.

Ellen Condliffe Lagemann writes, that Dewey's *Democracy and Education*, "reflecting his distance from classroom settings, provided a lengthy discussion of school curricula but rarely mentioned teachers."[105] Meanwhile, Chicago Teachers Federation teachers grew increasingly skeptical of the way that the district tacked teacher councils onto centralizing bills in order to gain their consent, rejecting bills that did so.[106]

5. **An expert Yankee versus union solidarity**

Toward the end of his stay in Chicago, Dewey made major strides on the pragmatist philosophy that would make him one of the preeminent philosophers in the country, if not the world. Dewey's pragmatism mirrored his pedagogical theory, privileging the experience of the individual in relation to idealist philosophy and transcendent religious beliefs. Dewey's shift from "experimental idealism" to embracing experience through pragmatism during his time in Chicago was made evident to the philosophical community in *Studies in Logical Theory.*[107] Dewey challenged the traditional epistemological dualism between thought and action through a unified concept of "experience" that encompassed both. Most of all, experience was self-organized and a "constructive process." [108] In short, experience was doing.

Experience provided a reconceptualization of not only human thought or activity, but of reality itself; Dewey argued that reality was defined by the "doubt-inquiry process" within experience, and "the nature of all objects of philosophical inquiry is to be fixed by finding out what experience says about them."[109] Analogously to how humans would no longer be organized by abstract, de-contextualized thought, reality would no longer be organized by a disembodied absolute. Reality would be constructed, suggesting that it could be relative to the constructor. However, it would also be modeled on experimental science, which Dewey saw as a mediator between philosophy and the "experience" of the "plain man."

Dewey cited his allegiances with the everyday or "plain man" and with the scientist as his reason for rejecting epistemological dualisms which bore little relation to real life. In 1891 he wrote to fellow pragmatist William James that "I presume to think that I am more of a Yankee and less of a 'philosopher' than sometimes may appear." [110] Drawing on this Yankee sensibility, Dewey attempted to find a more practical philosophy of mind than the epistemology that he had known.

While Dewey had rejected teachers' particular classroom situations and purposes as overly empirical, he embraced particulars, in the abstract, in his philosophy. Epistemologists' abstractions neglected the fact that, for the "plain man," "every reflective problem and operation arises with reference to some *specific* situation and has to subserve a *specific* purpose dependent upon its own occasion."[111] For Dewey, experience was what was real to the "plain man;" thought was "derivative and secondary" and "comes after something and out of something, and for the sake of something."[112]

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[105] Lagemann, "Experimenting with Education," 104.
[106] Urban, *Why Teachers Organized,* 43.
[107] For varying accounts of Dewey's transition from Hegelianism to pragmatism, see Martin, *The Education of John Dewey*, 130–131 and Dykhuizen, *The Life and Mind of John Dewey*, 82.
[108] John Dewey with the Co-operation of Members and fellows of the Department of Philosophy, *Studies in Logical Theory* (Chicago: The University of Chicago Press, 1903), 52.
[109] See Westbrook, *John Dewey and American Democracy*, 61 and Dykhuizen, *The Life and Mind of John Dewey*, 84 on Dewey's conceptualization of the doubt inquiry process in experience.
[110] Westbrook, *John Dewey and American Democracy*, 60.
[111] Dewey, *Studies in Logical Theory*, 4.
[112] Dewey, *Studies in Logical Theory*, 1.

While Dewey's pragmatism resisted epistemologists' abstractions in order to represent the plain man, it created new ones; namely the abstraction (and idealization) of the plain man's experience, still removed from the experiences (and the ownership) of any particular plain man. Workers were thus reduced to their work. Indeed, Dewey leaves much of the worker-philosopher and action-mind dichotomy intact in his statement that,

> In the logical process, the datum is not just real existence, and the idea mere psychical unreality… [rather,] datum and ideatum are divisions of labor, co-operative instrumentalities, for economic dealing with the problem of the maintenance of the integrity of experience.[113]

Charles Sanders Pierce noted this preserved division of labor in his review of *Studies in Logical Theory,* wondering if Dewey was "as radically opposed to the German school" as he was presenting himself. Pierce confessed that, "had he not put so much emphasis upon it, we should hardly have deemed the point of difference so important."[114] In contrast to Pierce, fellow pragmatist William James lauded the work of Dewey and his students in his review. However, he may have touched upon a central contradiction of the relativism in pragmatist philosophy in relation to the practice of philosophizing when he stated, "I cannot help believing that you have struck the *truth."*[115]

In claiming to represent a vague public in relation to epistemology, Dewey's pragmatism constituted an impressive faith that philosophy and the social sciences could represent the interests of non-philosophers. On this, biographer Robert Westbrook writes:

> Just as his psychological ethics posited a mediating intelligence capable of discovering "a unity of conduct which will organize the values respectively presented in the various competing impulses and desires," Dewey's political ethics was grounded in the hope that conflicts between individuals, groups and classes could eventually be resolved by the mediation of "socialized intelligence" guided by the findings of social science. [116]

In the vision of the university as producing democracy, Dewey echoed University of Chicago's President William Rainey Harper, who described the university as the "Messiah of Democracy"; in the face of a public that was well intentioned but not always well-informed, the university was "the agency established by heaven itself to proclaim the principles of democracy."[117] Despite the increased claims about the university's role in democracy, the expanded U.S. education bureaucracy, and particularly higher education, were emerging as "the central reproducers and legitimators of the class structure."[118]

In contrast to Dewey, Margaret Haley saw the potential of "co-ordinating… manual and mental labor," not as an intellectual problem for experts, but rather as an issue of solidarity, which "shall be accomplished through the affiliation of the organizations of brain and manual workers." Haley elaborates that

> The essential thing is that the public school teachers recognize the fact that their struggle to maintain the efficiency of the schools through better conditions for themselves is a part of the same great struggle which the manual workers—often misunderstood and unaided

[113] Dewey, *Studies in Logical Theory* (Chicago: The University of Chicago Press), 52.
[114] Dykhuizen, *The Life and Mind of John Dewey,* 86.
[115] Martin, *The Education of John Dewey*, 195–196.
[116] Westbrook, *John Dewey and American Democracy*, 81–82.
[117] Harper, *The Trend in Higher Education*, Chapter 1. See also Boyer, *The University of Chicago*, 116.
[118] Larson, *The Rise of Professionalism*, 145.

—have been making for humanity through their efforts to secure living conditions for themselves and their children.[119]

The pragmatism of the CTF also contrasted with the prolific paper-writing and idealizing of education experts and philosophers, even as these experts were writing about pragmatist philosophy. Marjorie Murphy notes that "unionization for teachers… required direct action, the antithesis of professionalism's linguistic monopoly."[120] Nolan comments that, "for some historians, Haley's pragmatism often seems to undermine any clear-cut ideological thrust to her activities."[121] David Urban describes in contrast that Haley's actions were very clearly defined by her priority of economic advantages for teachers. Regardless, Haley's pragmatism contrasts with Dewey's appropriation of the "plain man's" pragmatism into academic philosophy. Despite these differences between Dewey and Haley, they shared the belief that public schools would serve American democracy. For Dewey, however, this meant writing about it; for Haley this meant years of organizing to force Chicago corporations to pay their property taxes to secure school funding. [122]

In 1905, as Dewey left for Columbia, the Chicago School Board condemned teacher affiliation with the Chicago Federation of Labor as "absolutely unjustifiable and intolerable in a school system of a democracy."[123] The Loeb Rule (named after school board president Jacob Loeb) forced disaffiliation of the CTF from the CFL.[124] The national union of teachers that the CTF had worked toward was ultimately organized through men's teacher organizations, largely in New York and Chicago. Due to the Loeb Rule, ¾ of the founding American Federation of Teachers locals consisted of Chicago teachers (including CTF members).[125]

In New York, Dewey ultimately not only joined but also served as a philosophical guru for the nascent American Federation of Teachers (AFT). He had successfully learned from Ella Flagg Young that teachers should have some say in their teaching and could develop insights about teaching, albeit limited to the issue of how to apply pedagogical theory from non-teaching experts.[126] And Dewey certainly drew from both normal schools and the emergent Chicago labor movement a sense of the valor of doing, experience and moreover work. In his 1915 address to the American Federation of Teachers Local 5 in New York City, "Why I Am a Member of the Teachers Union," Dewey went as far as to say that teachers and academics should not look down on unions due to their association with work and its economic aspects, but rather embrace this association. He added that teachers' unions are in a privileged position to advocate for children due to their common interests.[127]

And yet, these were small concessions made against a long precedent of theorizing teachers (and workers') incapacity to generate constructive insights into their work. Indeed, teachers had been pigeon-holed into advocating for themselves narrowly on economic lines. On the one hand

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[119] Haley, "Why Teachers Should Organize," 222.
[120] Murphy, *Blackboard Unions,* 2.
[121] Janet Nolan, "A Patrick Henry in the Classroom: Margaret Haley and the Chicago Teachers' Federation." *Éire-Ireland* 30, no. 2 (1995): 108.
[122] Nolan, "A Patrick Henry in the Classroom," 107.
[123] Eaton, *The American Federation of Teachers,* 8.
[124] Nolan, "A Patrick Henry in the Classroom," 113; Dana Goldstein, *Teacher Wars: A History of America's Most Embattled Profession* (New York: Anchor Books, 2015), 84.
[125] Urban, *Why Teachers Organized*, 85.
[126] Young would later be elected as NEA president though a campaign led by Haley. See Murphy, *Blackboard Unions,* 77.
[127] John Dewey, "Why I Am a Member of the Teachers Union," Address delivered at the Membership Meeting of the Teachers Union of the City of New York, Local No. 5, American Federation of Teachers, on November 18, 1927. See John Dewey, "Why I Am a Member of the Teachers Union," in *John Dewey: The Later Works*, 1927–1928, ed. Jo Ann Boydston (Carbondale: Southern Illinois University Press, 1972), vol. 3, 269–275.

teachers were supposedly a-scientific and drowning in the particulars of their own classrooms. On the other hand, they were overly authoritarian and out of touch with their students' interests in comparison with experts. In isolating a "controlled" environment for experiments in teaching, Dewey silently admitted the difficulties of developing student-centered practice in overcrowded public schools. And yet he made no mention of a concern for teachers' work conditions in his early writings, despite the advocacy by Chicago teachers for increased teacher pay and reduced class sizes. In Dewey's aforementioned address to the AFT, he rather hypocritically argued that one of the major weaknesses in the education system—the "divorce between the head and the hand" —was because "teachers are too far remote from the work of the world; not too close to it."[128]

Dewey began to advocate for teachers' unions just as they became more male and accepting toward high school teachers and professors. Moreover, as socialism gained incredible steam, employers made material concessions to labor unions in order to reform the labor movement into a "constructive" part of US society. The added stability and comfort came with the restriction of the scope of bargaining, rendering labor less volatile.[129] Indeed, Dewey would later take up arms against the more militant stance of young teachers in AFT No. Local 5 during the early 30s. In contrast, Margaret Haley, now in old age, heartily approved of the growth of class consciousness in Local No. 5.[130] While teachers unions were ultimately integrated into the "constructive" social forces in the United States, they never gained substantial control over how educational experts would write about their work. Teachers are pre-supposed to not be "doing" teaching to this day.

The ideas about "doing" versus learning by rote that Dewey developed at the University of Chicago would be taken up as expertise in high school math pedagogy, albeit by a circuitous route, as I discuss in the next section. The Pestalozzian approach already enjoyed widespread popularity in the United States in the form of arithmetic textbooks, but progressive pedagogy had yet to make considerable headway into secondary education. Under the auspices of Dewey's fellow University of Chicago professors in the math department, anti-rote pedagogy would take the secondary mathematics education community by storm. For mathematicians, their efforts toward making prescriptions for teachers that were specifically *pedagogical* rather than exclusively about content took place in the context of rapid shifts in their nature of their work. Ironically, as they recommended "practical" mathematics for students so that they could understand math on their own terms, pure mathematicians were increasingly eschewing forms of work that they increasingly saw as "rote," namely applications, calculations and teaching in favor of decontextualized "pure" mathematics.

[128] Ibid., 275.
[129] Dray, *There is Power in a Union*, 228–229.
[130] See Murphy, *Blackboard Unions,* 150–159.

Chapter 4:
Making a Math That Was More (Than Rote Work)

"Everyone can agree that rule and rote are the enemies of progress in mathematics teaching."[1]
-Editors of *School Mathematics* (1904)

"Everyone agrees that something is wrong with math teaching."
-N. J. Lennes, Brown University Department of Mathematics (1908)[2]

Early American educators, inspired by the theory of "mental discipline," advocated the study of math because they theorized that general "mental capacities could be whetted to a fine edge on any subject difficult enough to afford some friction," and math offered plenty of friction.[3] Across the second half of the 1800s, progressive educators became suspicious of school math's enigmatic and punishing nature and sought to reduce its grip on the curriculum. By the turn of the century, and as the high-school attending population exploded, mental discipline was under escalating attack by young, reform minded Herbartians within the National Education Association.[4] Edward Thorndike's work in psychology appeared for the moment to be the last nail on high school math's coffin, demonstrating that students' progress in one skill wouldn't transfer to even very similar skills.[5] Most daunting was the fact that the growing student body was voting against math with their feet as districts ceased to require it in high school.[6] Students and progressives alike had asked "why do I need this?" and yet so far, the math education community had failed to adequately answer.

Various math education stakeholders, including math professors at universities and normal schools and high school math teachers rallied to arms to defend the future of jobs in mathematics education. Reform math instruction—particularly laboratory, inductive and unified mathematics—grew in popularity in the 1890s as a leading effort to solve school math's public relations problem.[7] Historians of mathematics education have explained the emergence of turn-of-the century math education reforms as at once a response to the attack on school math and as part and parcel to jurisdictional negotiation between mathematicians and university schools of

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[1] George W. Myers and C.E. Linebarger (Eds.), Editorial: Practice Does Not Make Perfect," *School Mathematics* 1 no. 2 (1904): 185–189.
[2] N. J. Lennes, "Modern Tendencies in the Teaching of Algebra," *Mathematics Teacher* 1, no. 3 (1908), 94. Lennes was instructor at Brown University at the time. Prior to that he had taught in the Chicago high schools from 1898-1907, overlapping with his PhD program at the University of Chicago, was briefly Head of the Department of Mathematics for the Chautauqua Summer Schools in New York, was instructor at Columbia from 1910-1913 and was Professor of Mathematics at the University of Montana starting in 1913. Varoujan Bedros, Daniel F. Finch, Charles Myers and Merrie Rampy, *History of The Department of Mathematical Sciences at The University of Montana: A Collection of Interviews*, ed. Johnny W. Lott (Missoula, MT: The Department of Mathematical Sciences of the University of Montana, 2006), 193.
[3] Wesley, *NEA,* 67.
[4] Kliebard, *The Struggle for the American*. While Dewey joined the ranks of the Herbartians because he felt that major reform was needed, he was, relative to many Herbartians, a centrist.
[5] E. L. Thorndike and R. S. Woodsworth, "The Influence of Improvement in One Mental Function upon the Efficiency of Other Functions," *Psychological Review* 8 (1901): 247–261. See the discussion in James Leach, "American Education Reform and the Humanism of Mathematics, 1890-1940," Undergraduate Honors Thesis, (College of William and Mary, 2017).
[6] George M.A. Stanic, "The Growing Crisis in Mathematics Education in the Early Twentieth Century," *Journal for Research in Education* 17, no. 3 (1986): 190–205
[7] David Lindsay Roberts, *American Mathematicians as Educators, 1893–1923* (Boston: Docent Press, 1997).

education.[8] The university field of mathematics education, which would provide teacher-preparation courses for high school teachers, emerged during the 1890s as the attack on the mathematics curriculum strengthened, and in some ways served to mediate this jurisdictional conflict.[9]

Building and drawing on my third chapter, I reconsider these jurisdictional conflicts between mathematicians and schools of education in terms of what both fields had in common. Namely, professors across departments claimed knowledge above and beyond teachers about the work of teaching, even as they organized to avoid low-status work in teaching themselves. The shift to reform math pedagogy emerged during the institutionalization of the American research university, and mathematicians and schools of education alike appealed to the academic ideal of the "active producer" for both researchers and young students. The "active producer" was capable of generating their own, new knowledge, and needed academic freedom from external authorities as well as free time away from non-creative, "rote" tasks to make this happen.[10] In this chapter, I argue that the ideal of the "active producer" was constructed in relation to the assumption that classroom teachers both did and enforced "rote work." Even as university professors sought to remove themselves from teaching duties, they argued that classroom teachers were in need of intervention from professors to stop the tyranny of rote work.

Ironically, the quest to enact active producer-hood -and to avoid "rote work" in its various forms- went hand in hand with the turn to abstract "foundations" for a variety of university disciplines, but perhaps most prominently mathematics, education and philosophy. Dewey would draw on "stages of civilization" as providing the foundation (in activity) for students' conceptual advancement. Mathematicians pursuing pure math would revisit arithmetic and geometry, axiomatizing them in an effort to put these foundational subjects on a firmer "foundation." The search for foundations facilitated fields in pursuing a philosophical route apart from applied work, contextualized practice in teaching or computing examples. It allowed university professors to construct themselves as "active producers" free from rote work.

Meanwhile, experts recommended quite the opposite for students as a means of shifting teachers out of their purportedly rote practices. New chairs of pedagogy and mathematicians interested in reform -namely Eliakim Hastings Moore at the University of Chicago and his students- would advocate that students engage in "practical" mathematics as an alternative to grappling with overly formal abstractions and rules. In the case of arithmetic, this meant learning arithmetic through working with concrete and familiar objects. In this way, students could have a concrete sense of what they were learning as they learned it, allowing them to understand

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[8] Leach, "American Education Reform and the Humanism of Mathematics;" Roberts, *American Mathematicians as Educators*; Stanic, "The Growing Crisis in Mathematics Education in the Early Twentieth Century"; George M.A. Stanic and Jeremy Kilpatrick, "Mathematics Curriculum Reform in the United States: A Historical Perspective," *International Journal of Educational Research 17*, no. 5: 407–417. Roberts and I both lean heavily on the trajectory of mathematics as a university discipline as portrayed in Karen Hunger Parshall and David E. Rowe, *The Emergence of the American Mathematical Research Community 1876-1900: J.J. Sylvester, Felix Klein, and E.H. Moore* (Providence: American Mathematical Society, 1994).

[9] On the development of math education professors, see Eileen F. Donoghue, "The Emergence of a Profession: Mathematics Education in the United States, 1890–1920" in *A History of School Mathematics,* eds., George M. A. Stanic and Jeremy Kilpatrick (Reston: The National Council of Teachers of America, Inc., 2003), Volume 1: 159–193.; Phillip S. Jones, "Epilogue: Summary and forecast." In P. S. Jones & A. F. Coxford, Jr. (eds.), *A history of mathematics education in the United States and Canada* (32nd Yearbook of the National Council of Teachers of Mathematics) (Washington DC: NCTM, 1970): 451-465. Donoghue in particular provides a very thorough account of the development of high school math teacher training, including David Eugene Smith's reorganizing of Ypsilanti's Michigan State Normal School (now Eastern Michigan University).

[10] A discussion of turn-of-the-century academic freedom apart from religious, political and economic authorities is very relevant here in its analogy to the students' freedom from despotic teachers as imagined in progressive pedagogy. However, I do not pursue "academic freedom" here due to space constraints and because I am focusing rather on how labor or work was imagined.

arithmetic with less direction from teachers and through a more enjoyable experience. The "practical arithmetic" of the past, grounded in commercial problems, was now discarded in favor of a new kind of practical.

The chapter focuses on university mathematicians' increasing efforts to remove themselves from anything suggesting "rote" work, including teaching undergraduates, applications and computing, in favor of time for "pure" research. The first section, "High School Professors," provides a point of contrast by describing the educational hierarchy of the mid to late 1800s, when teaching in high schools and universities were far more similar in status. The second section, "Inducting Away from Teaching," considers mathematicians' initial efforts in the late 1800s to remove themselves from "rote" work. Research, or the construction of new knowledge, was increasingly considered the opposite of teaching, or the rote transmission of knowledge that had already been developed.

The third section, "Psychology vs. Number: Founding the Foundation," details some of Dewey's interventions into math education and how they bumped up against university mathematics departments. This interaction reveals that both university pedagogical experts and mathematicians were absorbed in a search for the increasingly abstract "foundations" of their fields as a means of drawing distinction between their own work and "rote" work. The fourth section, "The Active Producers," describes that even as mathematicians increasingly moved to avoid the "rote" work of teaching, they still made prescriptions for mathematics education reform. A subset of mathematicians at the University of Chicago and under the leadership of Eliakim Hastings Moore took up advocacy for "practical" mathematics; an effort that has often been marked as the beginnings of math education research in the United States. The fifth section, "Self-Advocacy Through Experts," considers the development of math teacher professional associations out of a variety of occupations involved in mathematics education. I conclude with a commentary on the roting of teachers through the burgeoning development of mathematics education expertise.

1. High School Professors

In contrast to common (elementary) school teachers, American high school math teachers were an elite group until the late 1800s. High school attendance was reserved for an elite few, and high school teachers were often men trained at the university rather than women trained at normal schools.[11] Labaree describes that in the case of Philadelphia's Central High School, teachers were originally referred to as "professor," had dramatically larger salaries than common school teachers, and governed the school collectively without oversight.[12] In contrast, Chicago common school teachers were officially called "assistants."[13] In recognition of high school teachers' privileges, the Chicago Teachers Federation of female common school teachers excluded its high school colleagues from membership—along with administrators and professors—from its very beginning in the late 1890s. While few high school teachers attended

[11] Labaree, "Proletarianizing the High School Teacher." That said, the educational background of the teachers at Central High School was mixed; some had college degrees but many had graduated from Central High School themselves with no further training.
[12] Ibid., 3. On page 9 Labaree notes that the title of professor was abolished by the Philadelphia school superintendent in 1915.
[13] Marjorie Murphy, *Blackboard Unions,* 13.

National Education Association (NEA) conferences, they were initially lumped into the "higher education" department with university professors.[14]

Vice versa, the work of the university mathematician was more similar to that of the high school math teacher than it is today. University mathematicians were employed in their capacity for teaching rather than doing research.[15] Indeed, American mathematicians had yet to contribute substantially to the burgeoning European "pure" or modern mathematics scene, and most of the higher-level work was done for the military or by engineers. The category of "mathematician" was also larger and consisted of anyone who practiced math regardless of their place of employment. This included teachers, applied math practitioners working for the federal government, amateurs and even hobbyists or "puzzlers."[16]

That said, status differences between college professors and high school teachers—particularly those working in public schools rather than private academies—existed early on. High school teachers detected the "contempt with which many college men regarded high schools," and "rarely asked professors to their meetings" in the NEA. Referring specifically to the 1870s and 1880s, NEA historian Edgar Wesley emphasizes that there was no "golden period in which public school people [teachers and administrators alike] gratefully accepted the educational leadership of college and university professors."[17]

To the degree that college mathematicians and high school teachers enjoyed similarities in their work, this would change in the last quarter of the nineteenth century. On the one hand, high schools were rapidly expanding, and thus high school teaching lost the status that came with scarcity. As the ranks of high school teachers grew, they became subject to the bureaucratization of school systems. On the other hand, U.S. mathematicians would come to focus on the production of their own, original research in emulation of mathematicians in Germany, France and Italy. New, "modern" or "pure" developments were increasingly abstract and removed from application, even as they took on the familiar "foundations" of mathematics in arithmetic and geometry. As the next section explores, U.S. mathematicians would begin to organize for relief from the relatively rote work of undergraduate teaching in favor of training graduate students and free time for research.

2. Inducting Away from Teaching

Johns Hopkins would serve as the eminent example of the new American research university until the mid-1890s. Johns Hopkins' first president, Daniel Coit Gilman, who began his term in 1876, concerned himself with the development of postgraduate programs that would prepare one

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[14] Wesley, *NEA: The First Hundred* Years, 48–49. See also Wesley page 104–105 on how attendance at the Department of Higher Education meetings declined after 1910, and the department was abolished in 1924. This occurred during a time when NEA was increasingly focusing on teachers' welfare and public schools rather than higher education. It was reinstated in 1943.

[15] Roberts, *American Mathematicians as Educators,* 1. American Mathematical Society historian Raymond Clare Archibald describes that mathematical research in the U.S. did not begin before the early 1800s, and then only on a very small scale. See Raymond Clare Archibald, *A Semicentennial History of the American Mathematical Society 1888-1938 with Biographies and Bibliographies of the Past Presidents* (New York: American Mathematical Society, 1938), 1. Parshall and Rowe describe that increased specialization amongst university professors across the nineteenth century led to increased subject-specific identification; "Professors of chemistry or geology or mathematics gradually began to see themselves not merely as teachers but as chemists or geologists or mathematicians." The growth of research mathematics in the US had been stymied by British educational traditions focusing on rote memorization. Parshall and Rowe, *The Emergence of the American Mathematical Research*, 16.

[16] Ibid., 44.

[17] Ibid., 69. That said, it seems reasonable to think that there would be different levels of allegiance depending on subject area, and that algebra, Latin and Greek teachers would have a more vested interest in the colleges due to their use for college entrance exams.

to do research. This demanded faculty equipped to train graduate students in the research process; requiring both proven capacity and the free time to keep up with new developments. Johns Hopkins trustee George William Brown argued that university faculty should "be teachers in the largest sense, that is, should have the ability and the leisure too, to add something by their writings and discoveries to the world's stock of literature and science."[18] Ultimately Gilman would relieve research faculty from the standard teaching assignment of fifteen to twenty hours a week. Adjuncts, assistants (to be pulled from the graduate students) and visiting professors would help provide undergraduate instruction.[19]

Gilman hired 61-year-old British algebraist James Joseph Sylvester for Johns Hopkin's first professorship of mathematics on the basis of his research credentials. Amidst the increasing popularity of the experimental or "inductive" natural sciences conducted in the "laboratory," Sylvester would argue that, despite the deductive presentation of mathematical research, the process of *doing* math was one of inducting generalizations from specific examples; it was experimental.[20] Indeed, Sylvester's approach to his famed work in the theory of Invariants depended on the extensive computation of examples. Ultimately he was able to hand off this relatively rote aspect of his work to dedicated graduate students.[21] This trend toward abstraction and eschewing "rote" aspects of mathematics would only continue.

Sylvester was hired despite his poor teaching record with undergraduate students, and yet his record for inspiring mathematical producers was impeccable.[22] Sylvester's first student, one of the very first research mathematicians trained in the U.S., would recall that "the professor broke every rule and canon of the Normal Schools and Pedagogy, yet was the most inspiring teacher conceivable."[23] Sylvester's lecturing style reflected the joys of mathematical invention; he would follow the train of any thought that came to him rather than teaching a curriculum. He would have students work on open problems toward the goal of presenting "laboratory reports."[24] In

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[18] John C. French, *History of the University Founded by Johns Hopkins* (Baltimore: Johns Hopkins University Press, 1946), 7 (as cited in Parshall and Rowe, *The Emergence of the American Mathematical Research Community*, 55).

[19] Parshall and Rowe, *The Emergence of the American Mathematical Research Community*, 57.

[20] Sylvester described math as a process of "observation, divination, induction, experimental trial, and verification, causation too." Parshall and Rowe, *The Emergence of the American Mathematical Research Community*, 82. Sylvester famously broke from the tradition of the authoritarian religious university in England by refusing to sign the thirty-nine articles of the Church of England on the basis that he was Jewish. He endured considerable persecution while studying at Cambridge, being denied a fellowship that he was entitled to and a degree that he had completed the work for. When he managed to secure a post in the U.S. at the University of Virginia, he dealt with threats and a physical attack from a pair of aggravated brothers whose recitations he had critiqued. According to the story, after Sylvester lightly stabbed one of the brothers during an assault, he immediately escaped to England to work at the Royal Military Academy at Woolwich. He would stay there until he received his pension, when he was recruited to University of Chicago. Sylvester is truly an example of the effort for academic freedom from authoritarianism. See for example, George Bruce Halsted, "Original Research and Creative Authorship the Essence of University Teaching, *Science* 1, no. 8 (February 22, 1895): 203–207.

[21] Ibid., 118. Parshall and Rowe's Chapters 2 and 3 include a longer discussion on Sylvester's mathematical contributions.

[22] Appealing to Gilman to hire Sylvester, Harvard mathematician Benjamin Pierce wrote "If you inquire about him, you will hear his genius universally recognized but his power of teaching will probably be said to be quite deficient… [A]s the barn yard fowl cannot understand the flight of the eagle, so it is the eaglet only who will be nourished by his instruction… Among your pupils, sooner or later, there will be one, who has a genius for geometry… and that one pupil will give more reputation to your institution than the ten thousand, who will complain of the obscurity of Sylvester, and for whom you will provide another class of teachers." Benjamin Pierce to Daniel C. Gilman, 18 September 1875, Gilman Papers (as cited in Parshall and Rowe, *The Emergence of the American Mathematical Research Community*, 73–74).

[23] Halsted, "Original Research and Creative Authorship," 206. For an explanation of Halsted's career at Johns Hopkins, see Parshall and Rowe, *The Emergence of the American Mathematical Research Community*. Halsted actually graduated from Johns Hopkins on poor terms with Sylvester.

[24] Karen Hunger Parshall, "Historical Contours of the American Mathematical Research Community," in *A History of School Mathematics,* eds. George M. A. Stanic and Jeremy Kilpatrick (Reston: National Council of Teachers of Mathematics, Inc.,

short, Sylvester taught his graduate students to "*do* mathematics actively, not merely study it passively" …they had to "get their hands dirty"[25]

Under Gilman's leadership and in Sylvester's mathematics department, the role of the university professor was reimagined as first and foremost the role of a producer of original research, and their most important instructional role was to facilitate future mathematicians in embodying this role. Sylvester's first student explains Sylvester's belief that "without unceasing original research and published original work there could be no real university teaching, and that any university professor who, without such a basis, pretended to be a good teacher, was, consciously or unconsciously, a selfish fraud."[26] Sylvester's idea that original research was required to be a good teacher was restricted to the university setting, but had consequences for the image of classroom teachers (who had little to no time or support for original research) as well.

After Sylvester returned to England, Johns Hopkins attempted to hire German mathematician Felix Klein, but was unable to meet his salary requirements. Klein had made considerable ground in unifying pure and applied mathematics and would ultimately train a generation of American mathematicians in pure mathematics, albeit in Germany.[27] As Parshall and Rowe note, "Klein tended to soar above the terrain that occupied ordinary workaday mathematicians, taking in vast expanses of mathematical knowledge… Klein had no patience for thorny problems that required abstruse technical arguments." He focused on the "big picture, drawn from the work of his forerunners." In his avoidance of the "workaday" and "technical," Klein would make contributions in a wide variety of fields, including "geometry, group theory, Riemannian function theory, Galois theory, rigid-body mechanics, and even the general theory of relativity." Indeed, Klein exemplified an attempt to unify the various branches of mathematics.[28] However, by the mid-1880s, Klein's role had already shifted from being primarily a "creative mathematician" who trained a large and accomplished entourage of graduate students—who would in turn build a thriving community of pure math researchers in the U.S. —to influencing academic politics in Prussia.[29]

The failure to hire Klein would later be described as one of the bigger tragedies in American professional mathematics. In lieu of Klein, Johns Hopkins hired mathematical astronomer Simon Newcomb, who did not have the same repertoire of abstraction and "big picture" thinking. Roberts argues on Newcomb's behalf that he was a mathematical powerhouse in his own right, operating under difficult institutional circumstances.[30] Newcomb split his time between working at Johns Hopkins and at the *Nautical Almanac*. While Newcomb had considerable experience as a computer for the *Almanac,* he also achieved new levels of abstraction to his work in astronomy.

As the author for school math textbooks, Newcomb advocated for algebra as a way to relieve students of learning excessive arithmetic techniques, and for concrete experiments as a means to inductively get at abstraction. Predating the importation of Herbartian correlation into the United States and the unified math movement, Newcomb merged arithmetic and geometry in using a

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2003), Volume 1: 125–127; Roberts, *American Mathematicians as Educators,* 42–45. Roberts notes that while he has not seen evidence that the seminary was referred to by its participants as a laboratory, he would also be surprised if it was not. Parshall notes that despite their training in original research, jobs focusing on original research did not yet exist for Sylvester's students and they took jobs with heavy teaching loads.

[25] Parshall and Rowe, *The Emergence of the American Mathematical Research Community*, 82 & 106.

[26] Ibid., 204.

[27] Roberts, *American Mathematicians as Educators,* 63.

[28] See Ibid., 161 on the connection between Klein's unification of math and the curricular intervention of unified math.

[29] Parshall and Rowe, *The Emergence of the American Mathematical Research Community*, 148.

[30] Roberts, *American Mathematicians as Educators,* 63–67.

number line to represent the integers in his algebra textbook.[31] Despite his curricular inventions, Newcomb drew criticism for the ways that his lack of K-12 teaching experience was reflected in his textbooks, for example a lack of practice problems.[32]

Across the next ten years, American mathematicians would increasingly follow in the footsteps of their European counterparts in their focus on "pure mathematics," abstract and apart from application. In 1888, the founding of the American Mathematical Society—in emulation of the London Mathematical Society—formalized the collective interests of U.S. university mathematicians in focusing on pure research, rather than teaching or application. And yet, university mathematicians would not hesitate to make recommendations to K-12 education, despite their ever-increasing removal from it.

High schools were expanding astronomically. While there were 325 high schools in 1860, by 1890 there were approximately 2,536. In contrast to the college prep academies tied to the colleges by entrance exams, the new high schools had started relatively beholden to the (largely job-training) needs of the communities that they were located in.[33] Concerned about the development of the high schools outside of their control, the National Education Association assembled a committee consisting mainly of college professors and private school principals in order to administer organization to the burgeoning array of secondary school options.

The process of generating what would ultimately be the Committee of Ten Report quickly extended out of the typical terrain of curriculum recommendations and into the new purview of high school pedagogy. The committee had to deal with the increasing decline of math as a subject viewed as instilling discipline through practice in deduction—i.e. work—and the ascent of science as a school subject. Their solution was to portray math less in terms of its deductive character and more in terms of induction and experiment.

Under the leadership of Sylvester's successor at Johns Hopkins, Simon Newcomb, the Math Committee of the Committee of Ten drew from new developments in pure mathematics to recommend increased abstraction in arithmetic teaching.[34] For example, the basic issue of arithmetic operations' commutativity had become more interesting in light of research on commutative and non-commutative groups.[35] The Report recommends that students witness "by means of dots arranged in a rectangle, that three fives contain the same number of units as five threes," Then "when he sees that the commutative law is true, then it may be expressed to him in the general form, $a \times b = b \times a.$"[36]

The focus on abstraction was presented as a means of avoiding learning myriad rote procedures which "perplex and exhaust the pupil without affording any really valuable mental discipline."[37] The Math Committee "objected to laborious treatment of special cases in arithmetic which could be subsumed under general algebraic procedures." This meant a "disdain for some traditional topics of school mathematics, most notably commercial arithmetic," or what

[31] For Newcomb's use of the number line and career Roberts, *American Mathematicians as Educators,* 69.
[32] Ibid., Chapter 3.
[33] Wesley describes (probably through rose-tinted glasses) that "the people, ignorant of European educational ideas, freed from the domination of the academies, from the narrow theological dogmas that had pervaded schools, and from the superstitious awe of the classics, were working out their own educational salvation." Wesley, *NEA: The First Hundred* Years, 64–66.
[34] National Education Association of the United States, *Report of the Committee of Ten on Secondary School Studies: With the Reports of the Conferences Arranged by the Committee* (New York: American Book Co., 1894).
[35] Ibid., 92–93. Roberts notes that commutativity had become more interesting now that it was not assumed, for example in William Rowan Hamilton's quaternions.
[36] NEA, *Report of the Committee of Ten,* 109. The Committee also recommends projective geometry.
[37] Ibid., 97.

Colonel Francis Parker had referred to as "so-called practical" topics.[38] Despite its practicality for doing business, for most students the topics of commercial arithmetic "have no practical value," because "students are too young and inexperienced to understand the principles on which business is conducted," leading them to "waste valuable mental energy in fruitless struggles with problems which they cannot comprehend."[39] Rather than having students learn the myriad rules of commercial arithmetic directly from the teacher, the Math Committee recommended that abstractions be motivated "inductively" through concrete examples. Students would learn general arithmetic principles through their work with concrete "familiar objects."[40]

The use of abstraction to avoid endless procedures was represented as a move to emphasize students' autonomous knowledge construction: "rules should be derived inductively, instead of being stated dogmatically."[41] In this way, the emphasis on the 'abstract core' of mathematics was made to converge with the anti-rote work interests of the child, as long as the teacher could be convinced to avoid dogmatic rule-teaching. The comparison between discipline as-usual and the arithmetic the Committee of Ten was proposing was the same relation as "lifting exercises in an ill-ventilated room bear to games in the open air." In short, "the movements of a race horse afford a better model of improving exercise than those of the ox in a tread-mill." Through this avoidance of work, the student would "feel that he is mentally improved by the efforts he has made… to attain this end he must feel at every step that he has a new command of principles to be applied to future problems." [42]

In turn, the teacher would need to tease greater and more constructive reasoning out of the student, in contrast to the current "willingness of certain teachers to accept in lieu of the demonstration of a proposition any kind of evidence that the pupil understands it."[43] Within the Report, the professors frequently noted that teachers needed more and better training to pull off the recommended reforms.[44] These changes did not agree with everyone; indeed the Kansas City and Boston school superintendents noted that Newcomb lacked any classroom teaching experience and would be "promptly fired" if he attempted to gain some.[45] While the Committee of Ten Report was accepted for the time being, by the 1895 National Education Association meeting in Cleveland two years later, the Report would be reinterpreted by the new ranks of educationists as an onslaught from traditionalist college professors. While the Committee had cited laboratory instruction and the correlation of subjects as part of their reason to report, the final product was seen as containing no actual correlation, providing the commentaries of individual groups of university subject specialists instead.[46]

To conclude, math professors, within the broader emergence of the U.S. research university, were increasingly organizing for time for "pure" research devoid of rote computation. The new

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[38] Ibid., 2.
[39] Ibid., 107.
[40] Ibid., 97.
[41] NEA, *Report of the Committee of Ten,* 105.
[42] NEA, *Report of the Committee of Ten,* 108.
[43] NEA, *Report of the Committee of Ten,* 114. Notably, the Committee of 10 comes up against written work in favor of oral recitation, which would later become a stereotype of traditionalist teaching.
[44] NEA, *Report of the Committee of Ten.* For example, in their initial question-setting for the conference, the Committee asked, "can any description be given of the best method of teaching this subject throughout the school course?" See page 6. See also page 17-18 for the need of "better preparation of teachers."
[45] See Roberts, *American Mathematicians as Educators,* 101–102.
[46] For commentary see for example Charles De Garmo, *Herbart and the Herbartians* (New York: Charles Scribner's Sons, 1895), 215, so states that the "rational articulation of studies" is "everywhere demanded but nowhere achieved in this Report…. Nine different bodies of specialists meeting in different places and having no correspondence could not be expected to produce a course of study in which the various branches should be organically connected."

ethic of the "active producer," who taught by example and collaboration, was developed in contrast to the relatively rote work of teaching the canon. Even as math professors became more removed from the work of teaching anyone who was not training to be a math professor themselves, they sought to extend the ideological reach of the "active producer" and avoidance of rote work to K-12 math education. Ironically, this meant the eradication of "practical" problems in commercial arithmetic in favor of ascertaining general algebraic principles through a new type of "practical" problems that students could solve using familiar objects. Leveraging increasingly impractical mathematics research in school mathematics was the new "practical," as long as it drew on concrete objects.

3. Psychology vs. Number: Founding the Foundation

The idea of the student as an active producer, in the image of the new university researchers, was also institutionalized through the newly developing chairs and departments of pedagogy. However, in contrast to mathematicians, educators challenged the idea of abstraction as it applied to student learning. John Dewey famously embraced students' self-directed learning in activity, which he conceptualized in contrast to rote schoolwork. Dewey arrived at the Rockefeller-financed University of Chicago in 1894, after having been recruited by President William Rainey Harper. Harper was gearing Chicago to overtake Johns Hopkins as the premier U.S. research university. At the same time, he sought to expand the reaches of the university into teacher education (which was still largely undertaken at normal schools) and the operations of the Chicago public school district.[47] Dewey was just the person to help.

As head of the departments of philosophy and pedagogy, Dewey argued at length that the best way to avoid students doing rote work was for education professors to engage in an academic search for the foundations of education; psychologically, historically, and sociologically.[48] However, rather than experimentation, this involved applying a pseudo-historical, racist theory of human progress which held western society as the apex of civilization whereas the culture of indigenous people was compared to that of young children.[49]

Dewey gave central importance to students re-enacting the "stages of civilization." In order to re-enact these stages, students were to engage in historic manual occupations toward active re-discovery of concepts within the context of work. By revisiting the supposed social and economic foundations of civilization, the study of education would take content "out of the abstractness forced upon it for purposes of its own convenience of study and put into its concrete connections with the rest of the world."[50] In this way, the university could be connected to "the mass of men, and the things of daily life."[51] Ironically, this project of taking content out of "forced" abstractness would be led by professors—who traded in abstractions—rather than teachers.

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[47] Stinnett notes that by 1896, about half of US higher education institutions were offering teacher education courses. George Stinnett, "Teacher Education, Certification, and Accreditation," *Education in the States: Nationwide Development Since 1900: A project of the Council of Chief State School Officers,* Edgar Fuller and Jim B. Pearson, Eds., (Washington, DC: Council of Chief State School Officers, 1969), 388.

[48] For a key example, see Dewey, "Pedagogy as a University Discipline." Educational problems could be solved through "determining the relation of studies to the mind in its various stages of development," undertaken through "the most progressive psychology" and "a comprehensive philosophy."

[49] Otherwise known as recapitulation. See Fallace, "Repeating the Race Experience" *Curriculum Inquiry* 39, no. 3 (2009), 381–405 on the racist basis of Dewey's use of recapitulation.

[50] Dewey, "Pedagogy as a University Discipline," 287.

[51] Ibid., 285.

In asserting theoretical foundations as a privileged means of educational improvement, Dewey, among other university professors who did not work in K-12 education, asserted themselves as having improved knowledge of how to teach over teachers themselves. Indeed, as Dewey declared, "without insight into the psychological structure and activities of the individual, the educative process will, therefore, be haphazard and arbitrary."[52] In the current state of education "far too much of the stimulus and control proceeds from the teacher, because of neglect of the idea of the school as a form of social life."[53] Rather, teachers should rely on the science of pedagogy to inform them of the "certain interest" that number represents, psychologically and ethically. In practice, progressive pedagogy's orientation around "foundations" relocated the locus of educational knowledge from the teacher to the university, which Dewey argued at length was the correct location for such investigation.[54]

Dewey envisioned himself as forging a compromise between progressive educators and subject area specialists. In an effort to strike a middle ground within a particular content area, Dewey collaborated with Canadian educationist James McLellan on a treatise on the foundations of arithmetic, appropriately named *The Psychology of Number* (1895).[55] Dewey and McLellan proposed *The Psychology of Number* as an argument against progressive educationist's "reaction" to the growing perception that math was overly rote; namely, reducing mathematics courses as much as possible. As McLellan and Dewey explain, "however natural this reaction, it is none the less unwise when turned against arithmetic itself, and not against stupid and stupefying ways of teaching it."[56] In short, the salvation of the math curriculum would be to deal with teachers' "stupid" methods. Students were doing too much work in math class; "the work of getting "things" may be carried to such an extent as to burden the mind and check the growth of its higher powers."[57] Teachers' present methods "waste time, create apathy and disgust, dull the power of quick perception, and cultivate habits of inaccurate and disconnected attention."[58]

These problems of teachers could be dealt with through the "psychologizing" of arithmetic. Dewey and McLellan describe that the psychologizing of the mathematics curriculum should occur in relation to the development of arithmetic by humankind. They presumed that arithmetic developed as a means of measuring scarce resources, through which a portion of a group of scarce things is compared to the group as a whole as a form of ratio. Relating these supposed historical foundations of number learning in ratio and measurement to activity, McLellan and Dewey argued that number "is in reality a *mode of measuring value* [that] arises in the economical adaptation of things to some use or purpose."[59] Numerical operations were "simply phases of the *act of construction*… not something to be grasped by abstract thought" but rather "something done."[60] Echoing Francis W. Parker, Dewey and McLellan "have here tacitly assumed that number is a psychical product, and has a psychical reason for its origin."[61]

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[52] Dewey, "My Pedagogic Creed," 85.
[53] Ibid., 88.
[54] Dewey, "Pedagogy as a University Discipline."
[55] McLellan and Dewey, *The Psychology of Number.*
[56] McLellan and John Dewey, *The Psychology of Number*, xi–xii.
[57] Ibid., 2.
[58] Ibid., xi–xii.
[59] Ibid., 61. McLellan and Dewey define ratio obscurely as "that which fixes the magnitude or quantity which, in any given case, needs to be measured is some activity or movement, internally continuous, but externally limited. That which measures this whole is some minor or partial activity into which the original continuous activity may be broken up (analysis), and which repeated a certain number of times gives the same result (synthesis) as the original continuous activity." Ibid., 52.
[60] Ibid., 65–66.
[61] Ibid., 23–24.

Dewey and McLellan's work would quickly incite criticism from mathematician Henry Fine.[62] Fine was a mathematician who had trained in Germany under Felix Klein and had contributed to building the pure mathematics research community at Princeton.[63] He also had drawn on developments in pure math in his K-12 textbook writing. For example, the commutative, associative, and distributive properties had gained importance as properties of arithmetic operations among pure mathematicians, and Fine included them in his elementary arithmetic textbook for children called *The Number System of Algebra.*[64]

Fine took great issue with Dewey's assertion that the foundation of number was measurement, insisting that it was rather one-to-one correspondence, a set theoretic (pure math) concept of matching each member of one set with one and only one member of another set.[65] Fine insisted that humans must have counted before they ever developed practices for measuring, but his argument was primarily backed—as evidence by its presentation and in Dewey's response——through his appeal to abstract mathematical concepts that were currently being interrogated as a part of mathematicians' interrogation of mathematical "foundations."

Dewey got his chance at a final rebuttal in *Science*, noting that "one not having arrived at the *abstract* interest of the mathematician (and certainly the child to be educated has not) counts only *when* there is some value to be ascertained, and counts *by* setting off something," for example, a horse, as a unit of value.[66] Dewey admits his ignorance with respect to advanced mathematics, but then makes the claim that being a mathematician is a setback rather than a predisposition for theorizing how number concepts are acquired. For Dewey, his theory that "the differentiation and enumeration of units arises through the progressively accurate adjustment of means to end" could hardly be debunked by "a mathematical view which considers number only as it is after it is fully developed, and has become so familiar as to be itself a complete object of mind."[67]

While the two parties would disagree as to the conceptual foundation of number, they would at least implicitly agree that their debate about "foundations" should have implications for the fundamentally flawed practices of teachers. Fine summarizes that while Dewey and McLellan's book "advocates methods in teaching arithmetic that are in the main good," their account of the "neglect of teachers to lay sufficient stress on the metrical function of number has carried them to the extreme of maintaining that number is essentially metrical in its nature and origin."[68] Dewey appeals to mathematicians to "descend from their acquired mathematical plane and endeavor to rethink the psychical conditions and steps through which their present magnificent apparatus has grown out of primitive, non-mathematical, or crudely mathematical forms up to his

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[62] H. B. Fine, "Review of *The Psychology of Number and Its Applications to Methods of Teaching and Arithmetic,* by James A. McLellan, A.M., LL.D., and John Dewey, Ph.D. International Educational Series. D. Appleton and Co., New York," in *John Dewey: The Early Works*, 1882–1898, ed. Jo Ann Boydston (Carbondale: Southern Illinois University Press, 2008), vol. 5, xxiii–xxvii. Fine's review is included in the Appendices of the 2008 edition but not in the 1972 edition. First published in *Science*, n.s. III (January 1896), 134–36. Fine would also serve as president of the American Mathematical Society from 1911-1912. Analyses of this debate from Roberts and Leach highlight the "excruciating condescension" of Fine's jargony and impenetrable commentary. Leach additionally notes that Dewey had also skewered teachers. See Roberts, *American Mathematicians as Educators,*183–184 and Leach, "American Education Reform and the Humanism of Mathematics, 1890-1940," 39–40.

[63] Roberts, American Mathematicians as Educators, 88-89.

[64] Ibid., 92–93.

[65] Set theory was invented by German mathematician Georg Cantor. He famously used one-to-one correspondence to prove that there were more real numbers than positive integers; there were different sizes of infinity.

[66] John Dewey, "Psychology of Number," in *John Dewey: The Early Works*, 1882–1898, ed. Jo Ann Boydston (Carbondale: Southern Illinois University Press, 1972), vol. 5, 425–426.

[67] Ibid., 427–428.

[68] Fine, "Review of *The Psychology of Number,"* xxiii.

present high estate." If they could, "both parties may not only come to an understanding, but mathematical teaching may get what it today so largely lacks, some relationship to the psychical needs and attitudes of those under instruction."[69] Despite their criticism of teachers, neither Fine nor Dewey and McLellan would offer any teaching methods to support teachers in improving their instruction.

In order to "experiment" with the school as an "embryonic society," illustrative of society's foundations, Dewey founded a laboratory school on the University of Chicago campus. At the Dewey School, math was not granted any privileged access to the truth, but was rather reimagined "not primarily as one of the sciences but as a form of communication."[70] Number "was taught not as number," but rather as a means through which some activity, undertaken on its own account, was rendered more effective."[71] For example, "in the kitchen, also a laboratory," children learned numbers only because "they could not weigh or measure and thus carry on something which claimed both their interest and effort."[72] Dewey School teachers Mayhew and Edwards explain that students could realize "the need for number" as they set the table for lunch and put a spoon at each place setting for each person (indeed, this is a fine example of Fine's one-to-one correspondence).[73] Students pretended to be Phoenician traders as they developed standardized systems of measurement.[74]

Due to this approach "it is not too much to say that the children of this school used the symbols of language and calculation more intelligently and less mechanically than most, and with a certain sense of power in their expression."[75] Through pedagogy centering on the need for counting, students would make the connection between the concrete situation and symbol that mathematics textbook author Warren Colburn had likewise strove to attain. Dewey School students, in other words, would strangely avoid doing math as rote work, through playing at working various jobs. Students learned math in their capacity as "active producers," albeit in the context of kitchen work rather than the university.

Manual work done at the Dewey School was claimed to serve as the foundation for abstraction, as with expert guidance, "sciences gradually grow out from useful occupations." For example, physics would grow "out of the use of tools and machines, chemistry out of processes of dyeing, cooking, metal smithing, etc."[76] Dewey emphasized that teachers should know "how late in the race development abstraction occurs."[77] Indeed, "the recognition that the complicated formulae of the physicist as a means of valuation and control have evolved from a simple use of counting by the savage gave important educational implications for those directing this experiment."[78] In this way, academic occupations were positioned as the apex of human activity,

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[69] Dewey, "Psychology of Number," 427.
[70] Ibid., 308.
[71] Katherine Camp Mayhew and Anna Camp Edwards, *The Dewey School: The Laboratory School of the University of Chicago 1896–1903* (New York: D. Appleton-Century Company, 1936), 345.
[72] Ibid., 45.
[73] None other than Piaget himself would follow Fine in using one-to-one correspondence to describe children's development of number concepts. See Jean Piaget "The child's conception of number" in *The Essential Piaget: An Interpretive Reference and Guide*, eds. H. E. Gruber and J. Jacques Vonèche (New York: Basic Books,1941), 297–329. Mutual influence between mathematicians and psychologists is discussed in Chapter 5.
[74] For descriptions of the correlation of math with other activities see Mayhew and Edwards, *The Dewey School.* On the clubhouse, see page 232. On observing the sunrise and sunset, see page 214. On developing standard systems of measurement as Phoenician traders, see pages 120-121.
[75] Ibid., 346.
[76] Ibid., 255.
[77] Ibid., 344–345.
[78] Ibid., 345.

with "manual activities" stuck in past phases of human development, which teachers were charged with recreating. The teacher is "often quite unaware that the beginner cannot use [math] concepts intelligently unless they have been developed in the process of individual solving of some practical construction difficulty."[79]

And yet, over time, even the students at the Laboratory School were eventually led into mechanical practice. Ironically this was through the influence of the university on the university school, by dint of the university entrance requirements. The emphasis on "correlating" subjects such that they were interrelated in activity was alleviated as students got older and more mature. The "study of math also became more highly specialized." In other words, students studied algebra and geometry and worked out "for the most part independently, from twenty to thirty propositions and exercises and wrote up his demonstrations with varying degrees of care."[80] Mayhew and Edwards additionally admit that decontextualized practice in a skill is sometimes required, "when a group, for example, found themselves weak in a certain arithmetical operation or in language expression." However, even this could rhetorically be brought in accordance with the students' agency, as skills were "emphasized until the children exhibited to their own satisfaction a power and skill sufficient to enable them to go ahead in an independent fashion."[81]

As the college entrance exams came nearer, upper-level math teacher Clinton S. Osborn turned to Will's *Essentials of Geometry* so that students "were able to work more rapidly." In a rush, geometry was quickly "discontinued in May without reviewing the work done," in order to switch over to algebra. Despite the fact that "all the work usually prescribed for college entrance was taken up, only a few of the group completed the course in a satisfactory way." Mayhew and Edwards elaborate that students struggled with some combination of a "lack of a ready command of fundamental principles and processes" and having "not put sufficient time on study to acquire familiarity with and ready application of the principles." While "the work of three was highly satisfactory… even these needed a month of review before taking college examination."[82] Even in the oasis of the laboratory school, and with the assistance of the most updated educational philosophy of the time, teachers and students felt the pull of the pacing guide and fell back on the textbook to develop skill proficiency. Even in the oasis of the laboratory school, learning the mathematical canon ultimately became rote work. The next section considers the advances of university mathematicians in avoiding rote work.

4. The Active Producers

In 1895, Sylvester's first student, George Bruce Halsted, would explain the scientific ethos of his generation of university professors as, "action, production alone now receives our homage, now gives a life worth living."[83] As Halsted argued, nostalgically making an appeal to his (estranged) advisor, true teaching could only be done by an active producer of original research. Even a classroom teacher, "however subordinate," in order to have "the true informing spirit to vivify his book-knowledge," would need to

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[79] Ibid., 276.
[80] Ibid., 238–239.
[81] Ibid., 346.
[82] Ibid., 239.
[83] Halsted, "Original Research and Creative Authorship," 204. Halsted was a professor at University of Texas from 1884, but after speaking out against the board of regents, he moved in 1903 to St. John's College in Maryland and Kenyon College, ultimately working as an electrician (while still pursuing mathematics) in his later years. He was advisor to famous mathematicians R.L. Moore and L.E. Dickson. Kristy Sorenson, "Archives Spotlight: The George Bruce Halsted Papers."

have been in direct personal contact with some one of those great men whose joy it is to be able to advance the age in which they live, and lead on mankind to unexpected victories in the progressive conquest of the universe.[84]

This section outlines the advances of the idea of the "active producer" in the last decade of the 1800s and the first decade of the 1900s at the University of Chicago. On the one hand, researchers structured the image of the "active producer" around the increasing constriction of what counted as non-rote mathematical practice and teaching duties. On the other hand, the image of the active producer inspired a supposedly "new" reform movement in classroom mathematics toward making active producers out of students. While mathematicians became active producers through their engagement in increasingly "pure" and "abstract" mathematics, students would achieve the same by engaging in increasingly applied and concrete mathematics. The following sub-sections consider a variety of influences leading into the growth of the mathematics education reform movement at the turn of the century.

A. Moore at the University of Chicago

Akin to Dewey, leadership of the U.S. mathematics community migrated from Johns Hopkins to the University of Chicago. A Chicago Section of the American Mathematical Society had also been founded apart from the original in New York to accommodate these developments. Indeed, Chicago was becoming a nexus of a variety of groups organizing on behalf of their collective interests, from the Chicago Section of the American Mathematical Society (AMS) to the new Association of American Universities (apart from the National Education Association) to the Chicago Teachers Federation. The University of Chicago took a lead in facilitating research, which involved a removal from "rote" responsibilities in favor of active production. Professors were lured to Chicago with the understanding that they would work exclusively in the graduate school and not take on undergraduate teaching responsibilities.[85]

Under department head Eliakim Hastings Moore—who arrived in 1892—the Chicago math department aggressively pursued pure mathematics, ironically reaching new heights of abstraction through a focus on the very foundations of mathematics, including arithmetic and geometry. Indeed, mathematicians at the University of Chicago had ceased to think of the mathematicians of the prior generation, such as Newcomb, who had pursued applied work in fields such as astronomy, as mathematicians at all. Newcomb even apologized during his speech as exiting AMS president for "not being a mathematician in the modern sense."[86] In short, Newcomb's work had been deemed rote by dint of being born out of work in an applied context; he was guilty of manual math labor. Even Sylvester's inductive approach, on account of requiring computational examples as a basis for generalization, had become passé.

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[84] Ibid., 204.

[85] Boyer, *The University of Chicago: A History,* 81 explains that "Harper alluded to one salient reason for his privileging of graduate education when he mentioned that a "large number of the professors have been selected with the understanding that their work is to be exclusively in the Graduate School. Harper was probably not the first or the last university leader to attempt to recruit senior faculty with overt or covert promises that they would not have to teach undergraduates, but his words are striking nonetheless." Ultimately some senior faculty were disappointed when the University of Chicago recruited undergraduates more quickly than graduate students. See Ibid., 98–99 on Harper's vacillation on whether he saw teaching or research as a professor's most important duty.

[86] Roberts, *American Mathematicians as Educator*, 112. See Simon Newcomb, "Modern Mathematical Thought," *Bulletin of the American Mathematical Society* 3, no. 4 (1894): 95–107 (as cited in Ellen MacPhee Abrams, "Making Mathematics American: Gender, Professionalization, and Abstraction During the Growth of Mathematics in the United States, 1890-1945." PhD diss., (Cornell University, 2020), 13.

In contrast to the Johns Hopkins style of developing new abstractions inductively within the context of computational problems, University of Chicago graduate students studying pure mathematics became absorbed in the description of systems (such as geometry or arithmetic) or objects (such as a group) with a minimal number of independent postulates. For example, Christopher Hollings articulates the efforts of American mathematicians to develop a definition of an abstract group—a concept which had already been created—from a minimal and independent number of postulates.

For context, the integers with addition is an example of a group. As opposed to defining the integers as a particular and relatively concrete list of numbers, {…-2, -1, 0, 1, 2}, American mathematicians would develop a definition based on the *properties* of groups *in general*, of which the integers would only be a single case. These properties include closure (if you add two integers, the result is an integer), the associative property (if you are adding three integers, it doesn't matter which two you start with), an identity element (zero, because if you add zero to an integer you get back the integer), and inverse elements (for every integer there is another such that the sum of the two integers is zero).[87]

In the pursuit of axioms or postulates, American mathematicians owed to the work of European mathematicians such as David Hilbert and Felix Klein.[88] Harper and Moore had drawn largely from Klein's students in recruiting personnel.[89] The approach of the department, however, was largely inspired by Hilbert. In 1901 Moore had taught a seminar on Hilbert's *Foundations of Geometry*. The father of the modern axiomatic approach, Hilbert demonstrated the extreme abstraction that this entailed by never explicitly defining the basic geometrical objects of points, lines and planes as Euclid did. Rather, Hilbert proposes "three distinct systems of things" designated by variables.[90] Then, his axioms (dealing with connection, order, parallels, congruence and continuity) implicitly defined these objects. Retroactively, points, lines and planes were any type of objects whose relations satisfied the axioms.[91]

Strangely, Hilbert intended for this abstraction to not only be in touch with reality but to be a scientific advancement in human capacity to be in touch with reality. His axiomatization was meant to get at the core or foundation of our "intuition of space," for example, the intuition of betweenness.[92] The best way to understand the concrete was through an increasingly abstract understanding of space. Indeed, for Hilbert axiomatization was not intended as a means of escaping the concrete elements of math but rather of clarifying already well-developed disciplines as a means of providing improved avenues forward.[93] Strangely, in getting in better

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[87] See Hollings for the historical trajectory of this definition. Christopher D. Hollings, 'Nobody could possibly misunderstand what a group is': a study in early twentieth-century group axiomatics," *Archive for History of Exact Sciences* 71, no. 5 (2017): 409–481.

[88] See Hollings, "'Nobody could possibly misunderstand what a group is'" for the historical trajectory of the definition of a group as a part of his exploration of axiomatics in American mathematics.

[89] Parshall, "Historical Contours of the American Mathematical Research Community," 130. The first two of Klein's students hired at University of Chicago were Oskar Bolza and Heinrich Maschke

[90] David Hilbert, *The Foundations of Geometry,* translated by E. J. Townsend (LaSalle: The Open Court Publishing Company, 1950), 2.

[91] Leo Corry, "Axiomatics between Hilbert and the New Math," *The International Journal for the History of Mathematics Education* 2, no. 2: 21–37. See Hollings, "Nobody could possibly misunderstand what a group is," 412 for a footnote on the distinction between postulates and axioms. Postulates is generally used as a more arbitrary hypothesis than an axiom, but these two words tend to functionally mean the same thing as far as axiomatics went.

[92] David Hilbert, *The Foundations of Geometry,* 1.

[93] Abrams, "Making Mathematics American," 9; Corry, "Axiomatics between Hilbert and the New Math," 4; Abrams explains that, despite his interest in axiomatization *in support* of the concrete or intuition-based elements of geometry, Hilbert would ultimately be blamed for turning math into an empty, meaningless game. He thus attracted criticism from mathematicians such as Poincaré and Klein.

touch with human spatial intuition, Hilbert had made the concrete constitutive parts of human spatial intuition just one case of his highly abstract systematization of geometry.

In contrast to Hilbert's geometry-centered notion of axiomatics, which was intended to help resolve specific problems of geometry, Moore took up axiomatics as a pursuit in and of itself, inspiring a community of American mathematicians including L.E. Dickson, E.V. Huntington, E.H. Moore, R.L. Moore, O.Veblen (E. H. Moore's student), B.A. Bernstein, E.R. Hedrick, J.R. Kline, and H.M. Sheffer.[94] These mathematicians sought to cleanse their systematizations from relatively concrete mathematical "objects" in favor of their abstract properties.[95] While this was a search for the abstract, it was grounded in American pragmatism in that researchers were not searching "an immutable set of perfect postulates," but rather take an exploratory approach in which the same concept could be viewed (or defined) in multiple ways.[96] As professional mathematics centered on describing the "foundations" of mathematics, math was, now definitionally, not a calculatory enterprise. Calculating (i.e. computing) became an occupation that even women could do.[97] Whereas scientists in other fields were welcome to apply the new abstractions, pure mathematicians were avoiding working in any applied context themselves, akin to the emerging relationship between teachers and pedagogical experts.[98]

Moore and University of Chicago President William Rainey Harper agreed on their project of emulating the German University.[99] At Chicago, Harper's university-wide fetishization of the "laboratory," and "doing work" with "real" materials in a controlled environment corresponded strangely with the move to increased abstraction, even for subjects like math that didn't need a laboratory. The idea of practice or work as productive was being appropriated into a new vision of science, even as that vision of science specifically formulated itself as the antithesis of forms of now "rote" work, such as teaching, applied mathematics, or computational methods.

Within Chicago's math department, the vision of the laboratory played out through the Mathematical Club, akin to Sylvester's Seminary where graduate students would share knowledge. Moore specifically trained graduate students in the art of communicating ideas to others in generative ways. Within the context of the university, Moore was trying to train his graduate students as active producers.

However, following in Harper's footsteps, Moore had also turned his interests to teacher training and K-12 education. Moore agreed with Harper that teaching should be informed by research; both pedagogical research and research in the content to be taught. Secondary teacher training was becoming an increasingly lucrative business for universities. Moore had additionally expressed an interest in collaborating with Dewey on developing a laboratory for math teacher training; first teachers in training would participate as students, and then learn how to practice the laboratory method themselves.[100]

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[94] Michael Scanlan, "Who Were the American Postulate Theorists?" *The Journal of Symbolic Logic* 56, no. 3 (1991): 981-1002.
[95] Hollings, "'Nobody could possibly misunderstand what a group is'"; Eliakim Hastings Moore, "On the Foundations of Mathematics," *Bulletin of the American Mathematical Society* 9, no. 8 (1903): 402–424.
[96] Abrams, "Making Mathematics American," 33. See also Abrams page 67–68 on how American Postulate theorists' willingness to sidestep ontological questions allowed for "multiple bests and called for the continual reevaluation of truth in action."
[97] See Lorraine Daston on the decline in "the epistemological status of calculation... toward the turn of the nineteenth century as it became an appropriate form of work for women or machines." Lorraine Daston, "Enlightenment Calculations," *Critical Inquiry* 21, no. 1 (1994): 182–202 (as cited in Abrams, "Making Mathematics American," 26).
[98] See Abrams, "Making Mathematics American" on the new nature of application in turn of the century professional mathematics.
[99] Roberts, *American Mathematicians as Educators,* 128.
[100] Ibid., 168–69. Roberts reviews prior accounts of the relationship between Moore and Dewey.

As early as 1897, Moore had participated in editing an arithmetic book based on the "the inductive or laboratory method" which stated upfront that it "gives no rules" and that "the teacher should give no rules." As an example, it borrowed from the Committee of 10 Report the idea for a dot diagram reflecting that multiplication is commutative, without explicitly defining this property under the assumption that students would figure it out themselves.[101] In this way, Moore's hopes for students would emulate the vision of the active producer for mathematicians. Indeed, some of Moore's graduate students would come to focus on progressive high school mathematics pedagogy instead of pure mathematics research, most notably Jacob William Albert Young.[102]

However, Moore's prescription for how students should achieve this was largely the opposite of what pure mathematicians were now undertaking; students and mathematicians would avoid rote in opposite ways. As Moore recommended that students engage in math concepts through the concrete, mathematicians increasingly rejected objects in favor of their abstract properties. As Moore and others decried the bureaucratic axiomatizations of Euclid for secondary students, their internal primary project was axiomatization. In his famed exiting speech as president of the American Mathematical Society, Moore advocated for the laboratory method and correlation between math and science as a means of engaging students in "the practical sides of mathematics." [103] This was as mathematicians were eschewing applied problems. As Moore made pedagogical recommendations, he participated in the new vision of mathematics research that emphasized free time for research and release from teaching. Whereas Moore's vision for student learning and for mathematics research were in some large part opposites, that both emphasized the avoidance of rote was a multifaceted argument that the "rote" work of teaching was not up to par with that of real research mathematicians and was in need of pedagogical intervention from outside.

B. The Influence of John Perry

The reform of mathematics pedagogy was an international concern. In making his pedagogical prescriptions, Moore would cite the influence of the widely popular John Perry, professor of mechanics and mathematics at the Royal College of Sciences of London and chairman of the Board of Examiners for the British Board of Education. Perry had provocatively (and dramatically) spoken out in defense of boys who would become "the average man" against the hegemony of Euclid's *Elements* in high school geometry courses and college entrance examinations.[104] Rather than engaging in memorizing Euclid's postulates and engaging in endless deduction, Perry thought that students should learn geometry in its more concrete and practical sense. This would be both more accessible and interesting for students, and more useful for training the engineers that were under heavy demand in England.

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[101] Eliakim Hastings Moore, ed., *Grammar School Arithmetic by Grades* (New York: American Book Co., 1897), preface. Analysis is from Roberts, *American Mathematicians as Educators*, 155-157.

[102] For information on Young's career see Roberts, *Mathematicians as Educators*; Leach, "American Education Reform and the Humanism of Mathematics: 1890-1940." For an example of his writings see J.W.A Young, *The Teaching of Mathematics in the Elementary and the Secondary School*, (New York: Longmans, Green, and Co., 1907).

[103] Abrams, "Making Mathematics American," 65 points out the double meaning of foundations of the discipline and foundations as a topic of research; prior to encountering Abrams' account I had only considered the foundations as a topic of research and K-12 education.

[104] W. H. Metzler, "Editorial" *The Mathematics Teacher* 1, no. 2 (December, 1908): 43. The editorial of this issue covers "The Perry Movement" and Perry's speech made at the November 28 1908 joint meeting of the British Mathematical Association and the Federated Associations of London Non-Primary Teachers. There is a large number of heresay accounts of this famous address, which serves as a starting point for some histories of math education reform, for example see Gertrude Jones, "Unified Mathematics in Secondary Schools," *The Mathematics Teacher* 17, No. 5 (May 1924), 290–300.

Perry compared requiring that students learn Euclid before applying geometric ideas to "saying that a boy must not wear a watch or a pair of trousers until he is able to make a watch or a pair of trousers," or "compelling all emigrants to pass to America through Cuba, because Cuba was discovered first."[105] He asserted that "we learn first by actual trial… we philosophize afterwards."[106] Students should start with the concrete but not with work. Starting with "trial," or application, for students was quite the opposite of what was happening in the pure mathematics research scene.

Owing to the Herbartian movement, Perry argued for the correlation of mathematics and science.[107] He also advocated for the laboratory, where "boys should learn to weigh and to measure, to calculate," and "find things out for themselves."[108] Indeed, many mathematical developments did not need to be "found out" by boys at all; "our mathematicians are spending their time now [after considerable advanced training] in proving all sorts of things which the plain man does without getting preliminary permission."[109] Perry cited the example of elite Cambridge mathematicians who didn't think students could possibly understand what is meant by *ds/dt*, or speed. If Perry's ideas and concerns sounded familiar, Perry unabashedly explained that "my ideas are mere truisms, mere copy-book maxims, known to every educationist - but never till now applied to mathematics."[110]

Perry poised himself to help save a wide variety of students from the ill-treatment of traditional mathematics teaching, while also promoting pedagogical methods that could serve the future mathematician as well. In his experience, "there is hardly any man who may not become a discoverer, an advancer of knowledge," i.e. an active producer.[111] In contrast, Perry had a decidedly negative view of the teaching force. Perry noted that traditional instruction would reproduce "the mental attitude of the Schoolmen;" "that all his difficulties were solved long ago; that almost no old mathematical man he meets ever makes a new discovery, nor wants to make one."[112] While he claimed extensive past teaching experience, he spoke of his old teacher self as an "orthodox teacher of mathematics… doing [his] best to destroy young souls."[113] Perry also referred in generalities to "our stupid methods of teaching" and "unscientific ways of thinking," politely including himself in "our."[114]

Perry bemoaned teachers' misapplications of his theory and was quoted as saying "I do not say that some teachers are carrying our reforms too far; I say that they do not at all comprehend the nature of the reforms suggested by the British Association and other committees." Another hear-say report of a speech by Perry quotes him as complaining that, in response to his recommendation that students make graphs on squared (graph) paper, "some teachers do nothing but graphs… It reminds me of a friend who does so many things with cement that I almost think

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[105] John Perry, "The Teaching of Mathematics," *Nature,* 62, no. 1605 (August 2, 1900): 318
[106] Ibid., 318.
[107] While it was common for mathematics education experts to call for the correlation of math and science, education professors often called for the correlation of *all* subjects. As discussed in the previous section, Dewey called for the correlation of all subjects guided by the child's activity.
[108] Ibid., 143.
[109] John Perry's response to Victor C. Alderson's "Five Cardinal Points in the Perry Movement*," School Mathematics: A Journal for Mathematics Teachers* 8, no. 2 (March 1904): 194.
[110] Ibid., 195.
[111] *Discussion on the Teaching of Mathematics,* 8.
[112] Ibid.,7.
[113] Perry, "The Teaching of Mathematics," 317.
[114] Ibid., 318.

if he wanted a new umbrella he would make it of cement."[115] For Perry, "many teachers seemed to have no individuality, no originality, nor even the power to think for themselves at all."[116] At the same time, while professors should give recommendations about teaching, they should not condescend to do actual teaching, as when they did, "the boys wasted much time in learning such subjects as deductive geometry, artificial devices for solution of triangles, and drudgery with algebraic symbols.[117] In order to have correct ideas about teaching, one needed to not be doing it.

Of course, Perry would have his critics, including Sylvester's student George Bruce Halsted, who declared Perry's discussion before the British Association to be "distinctly anti-Germanic, anti-Euclidean" and "reactionary."[118] While Halsted agreed with the impetus of increasing students' autonomy and capacity for knowledge production, as well as with the need for a "sensuous" introduction to geometric concepts, he argues that "the preliminary must fit the rational geometry."[119] Indeed, Halsted provides a very long list of ways in which recent results in geometry (primary those of Hilbert) would conflict with students' spatial and motor intuition.

While for education professors such as Dewey, abstractions had come under increasing suspicion as "mental constructs" in relation to concrete intuition, the opposite was true for pure mathematicians. For Halsted, concrete intuitions like "space" or "a line" were mental constructs that were under suspicion for their ambiguity, to be resolved through systematization and definition.[120] Speaking from this perspective, Halsted thought that students should be made to encounter "the whole truth" from the very beginning of their training such that they didn't over-rely on faulty intuitions.[121] Halsted's appeal to what would generally be interpreted as traditional instruction was made on the basis of updated pure mathematics.

Halsted's concern about "the whole truth" drew a rebuttal essay from Dewey, who emphasized that the student can't simply inherit what is in the mind of the teacher.[122] Rather, there may be "factors not valid in a strictly demonstrative sense" that are "needed in order to assist the mind, which is only in the process of becoming logical in general and of becoming geometrically logical in particular." Indeed, even mathematicians find it "advisable to resort to

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[115] Metzler, "Editorial" *The Mathematics Teacher,* 42. To be fair, Perry accused "the great Cambridge mathematicians [who] are all [his] personal friends" of being unable to understand his ideas as well. However, this was because of their sectarianism rather than their supposed stupidity. On this see John Perry's response to Victor C. Alderson's "Five Cardinal Points in the Perry Movement*," School Mathematics,* 94. It should also be noted that Perry was a huge and pioneering advocate for the use if "squared paper," or graph paper in instruction. At the time, it was used primarily as a professional tool for engineers and other careers using applied math.

[116] John Perry, "The Correlation of the Teaching of Mathematics and Science," *Nature* 79 (1908): 143.

[117] Ibid., 143.

[118] George Bruce Halsted, "The Teaching of Geometry," *Educational Review* 24 (June – December 1902): 458.

[119] Ibid., 457.

[120] While many pure mathematicians would develop the interrogation of intuitions as a disciplinary practice, they did not necessarily believe that, process-wise or epistemologically, intuitions were backed by logic. In other words, while Halsted chimed in on this debate, his view was not necessarily representative. Poincaré and Hilbert both drew from Kant the belief that universal experiences of time and space were how math was able to be non-empirical and yet have content. This sense of time and space were "a priori intuitions." Hilbert would begin his *Foundations of Geometry* with a quote from Kant; "all human knowledge begins with intuitions, thence passes to concepts and ends with ideas."

[121] Halsted, "The Teaching of Geometry," 457.

[122] See page 217, John Dewey, "The Psychological and the Logical In Teaching Geometry," in*John Dewey: The Middle Works, 1899-1924*: *1903-1906,* ed. Jo Ann Boydston(Carbondale: Southern Illinois University Press, 1977): 216–228. Originally in *Educational Review* 25 (1903), Volume 3: 387–99.

intuitive constructions."[123] For Dewey, "the real problem of teaching geometry [is] one of *continuous* modulation and gradation" between intuitive and rational geometry."[124]

Speaking on behalf of teachers in this particular context, Dewey explains that "the need and demand for teaching arise from the fact that the whole truth is not there to build upon."[125] There is likely a majority of students "to whom considerations of method will always remain valuable chiefly because of their instrumental significance," as "tools in the region of application, invention, construction…"[126] He notes that "mathematicians as mathematicians are not called on to reckon with this class, but those who are concerned with teaching must take them into account."[127] Indeed, some students may get more from the method that is "somewhat loose from the logical side" in terms of rigor, or even in terms of utility for their own lives. The more "loose" method could also offer an opportunity to teach students definitions as they are used by academics; as "provisional résumés and working hypotheses, not definitions purporting to possess finished logical worth.[128]

This conversation between Perry, Halsted and Dewey would reify a dichotomy between 'intuitive' and 'abstract' thought, even in calls to modulate between the two. The debate between which- intuitive or abstract- was the "foundation" or evidentiary backing for the other had its basis in philosophical arguments rather than teaching, despite the invocations of teachers. Moore would cite Perry extensively in his influential address on math pedagogy, as discussed in the next section. Indeed, Dewey's response to Halsted had cited comments from Moore, and footnoted Moore's "identical address," wishing to "record his indebtedness to Professor Moore for various suggestions."[129] Moore would cite Dewey in passing but would credit Perry (who noted that he was merely parroting educationists) as the most relevant influence on his views.

C. On the Foundations, Foundations and Foundations of Mathematics

Moore's final, controversial lecture as president of the American Mathematical Society, "On the Foundations of Mathematics," made a triple entendre of the foundations of mathematics as they were taught in the common schools, the foundations of American mathematics as a professional discipline, and the foundations of mathematics as a relatively new topic of research.[130] Indeed, Moore's speech was a formative moment in reconciling a variety of expert visions of foundations in mathematics education. He was a representative of the disciplinary re-examination of the foundations of mathematics, eliminating the intuitive in favor of a logical and abstract foundation, and spoke on recent developments in this arena. And yet, in the same speech, he would advocate for the educational re-examination of the foundations of mathematics in K-12 math classrooms, putting the formal on an intuitive foundation. These two efforts could be reconciled through their mutual appeal to the active producer. Moore's approach was pitched to the American Mathematical Society, which was in large part an organization built around the

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[123] Dewey, "The Psychological and the Logical In Teaching Geometry," 227. Roberts, American *Mathematicians as Educators*, 189 speculates that Dewey's suggestion that he has been told that even mathematicians require "intuitive constructions" reveals behind-the-scenes communications between Dewey and Moore.
[124] Ibid., 217.
[125] Ibid., 219.
[126] Ibid., 228.
[127] Ibid., 223.
[128] Ibid., 223-224.
[129] Ibid., 216.
[130] Abrams, "Making Mathematics American," 65 points out the double meaning of foundations of the discipline and foundations as a topic of research; prior to encountering Abrams' account I had only considered the foundations as a topic of research and K-12 education.

avoidance of "rote" tasks like applied math and teaching, to "win for [math] the very high position in general esteem and appreciative interest which it assuredly deserves."[131] This speech would be variously attributed as the catalyst for the mathematics education reform movement in the United States.[132]

Moore begins by providing, as expected in an AMS presidential lecture, an overview of developments in "abstract mathematics," almost entirely from Europe. This lay of the land provides a description of the axiomatic method, in which pure mathematicians would seek to describe or, more appropriately, "construct" a system - such as a group or even geometry at large - through a minimal set of independent axioms. As Moore describes, citing Italian mathematician Alessandro Padoa, "having in mind a definite system of postulates, we have first of all the notion of the compatibility [now generally known as consistency] of these postulates; that is, that it is impossible to prove by a finite number of logical steps the simultaneous validity of a statement and its contradictory statement." The other concern of axiomatics was a set of postulates' independence or irreducibility, "that no postulate is provable from the remaining postulates."[133]

Moore moves on to discuss Hilbert's axiomatization of geometry through the undefined symbols point, line, plane, incidence of a point and line, incidence of a point and plane, between and congruent. And yet based on these definitions, "Hilbert's system of undefined symbols is not in Padoa's sense irreducible."[134] He references his student, Veblen' recent work on the axiomatization of geometry using only the undefined symbols "point" and "between" or "point" and "segment," which allowed him to construct projective geometry, and then Euclidean geometry as a "subgroup of the group of collineations of projective geometry." This brings up the issue of whether congruence is made redundant by the symbols "point" and "between." He points to the open problem of whether axiomatizations of arithmetic or of the real numbers were compatible.[135]

However, at least within the context of his AMS speech, Moore's review of contributions to axiomatization is also geared to point out the fundamental (or potentially foundational) futility "in making precise the metes and bounds of logic and the special deductive sciences." This was not an appeal to cease work in axiomatization, but an appeal to the continuing relevance of intuition and implicit agreement. In trying to get to a more foundational idea of mathematics through abstraction and systematization, mathematicians were potentially "losing sight of the evolutionary character of all life processes, whether in the individual or in the race… Certainly the logicians do not consider their science as something now fixed." [136] Moore notes the myriad assumptions that mathematicians must make, even in their avoidance of assumptions, for example regarding definitions such as that of a "finite number" of symbols, what counts as a single postulate, what a permissible step of deduction is, and so on and so forth. He hints, citing Poincaré, that in spatial and motor intuition is "the basis of that generality without which there would be no science."[137]

In this way, Moore opens into his advocacy for the (1) the continued relevance of applied mathematics and (2) the continued relevance of thinking about teaching. In short, Moore is

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[131] Ibid., 413.
[132] See for example Jones, "Unified Mathematics in Secondary Schools," 290. Jones describes that associations of mathematics teachers were formed around various parts of the United States in order to "spread the doctrine." In this way Moore followed the role of Felix Klein in advocating for education reform, specifically for a tighter connection between pure and applied.
[133] Moore, "On the foundations of mathematics," 403.
[134] Ibid., 404.
[135] Gödel's Incompleteness Theorem would prove that they were not in 1931.
[136] Ibid., 405.
[137] Ibid., 406.

requesting that the various tasks that mathematicians were increasingly eschewing as rote be re-entered into their field of interest. That said, he promotes them not in the sense of actually doing the rote work, but rather as an area for reflection and offering prescriptions, and pedagogical ones in particular. Moore does not discuss applied math and the alienation of the "practical working mathematician"[138] from pure math in order to entice an increase in applied work, but rather to entice an interest in pedagogical reforms. Pursuing this, Moore cites the "surprisingly vigorous and effective agitation" of John Perry, and his two-pronged approach of drawing on what is interesting and familiar to the student.[139]

Moore recommended the "diminution of emphasis on the systematic and formal sides of mathematics"; students should study "the subject itself, and not the words, either printed or oral, of any authority on the subject."[140] Students would also learn that "mathematics is indeed a fundamental reality of the domain of thought, and not merely a matter of symbols and arbitrary rules and conventions."[141] The teacher would utilize "all the experience and insight of the whole body of students."[142] Rather than learning through the direct instruction of the teacher, "in most cases, much of the proof should be secured by the research work of the students themselves."[143] For example, Moore suggests that the student "be directed each for himself to set forth a body of geometric fundamental principles, on which he would proceed to erect his geometric edifice… This method would be thoroughly practical and at the same time thoroughly scientific."[144]

Pedagogy should emphasize "the practical sides of mathematics, that is, arithmetic computations, mechanical drawings and graphical methods generally, in continual relation with the problems of physics and chemistry in geometry."[145] Through engagement with the concrete, the student would learn to embody the active producer. As an example, Moore cites Perry on the potential of taking "the notions underlying the infinitesimal calculus" … "as axioms; for instance that a map can be drawn to scale."[146] By engaging in Perry's approach of the familiar and interesting, students would learn to "be sure in a naïve and elementary way," and mathematics education would then be imbued with the "spirit of research."[147]

Mathematicians at the eastern colleges did not appreciate Moore's divergence from addressing scientific issues nor his entrance into educational criticism.[148] However, while they argued against him, this was on the basis of a shared belief in the practical as a vehicle for forming abstract mathematics concepts; they just disagreed on what would count as this practical or sensuous basis for generalization. For example William Fogg Osgood, a student of Klein and 1905-1906 AMS president, felt, along with Halsted, that the "road to the qualitative is through the quantitative."[149] Students would still do induction, but rather from "many, many simple quantitative problems" (in the style of Pestalozzi) rather than from applied situations (in the style

[138] Ibid., 417.
[139] Ibid., 409.
[140] Moore, "On the Foundations of Mathematics," 405 & 419.
[141] Ibid., 412.
[142] Ibid., 419.
[143] Ibid., 419.
[144] Ibid., 416.
[145] Ibid., 411.
[146] Ibid., 411.
[147] Ibid., 411 & 406.
[148] Roberts, *American Mathematicians as Educators*, 217 cites a letter from David Eugene Smith to Moore in 1904 on these reactions.
[149] William F. Osgood, "The Calculus in Our Colleges and Technical Schools: Presidential Address Delivered Before the American Mathematical Society April 27," *Bulletin of the American Mathematical Society* 13, no. 9, 450.

of Herbart).[150] Natural scientists did not appreciate the invasion of mathematicians interested in correlating into the science curriculum.[151] On the other hand, Moore received laudatory attention in the western states and amongst emerging teachers' professional associations.

Moore notes that in order for the reforms to work, "teaching must become more of a profession… and this implies not only that the teacher must be better trained for his career, but that also in his career he be given with greater freedom greater responsibility." Accordingly, the instruction should be given "by men who have received expert training in mathematics and physics as well as in engineering."[152]Akin to Harper's approach for expanding the University of Chicago's reach, Moore explains that "to this end [of professionalization] closer relations should be established between the teachers of the colleges and those of the secondary schools." This would include, for the "leading secondary school teachers," access to the American Mathematical Society (this would not happen), conferences for improving secondary school curricula and college admissions requirements, professional organizations, and encouragement to "devise and try out plans looking in any way toward improvement.[153] Indeed, the "strongest teachers, finding the project desirable and feasible," would serve to build moment for Moore's reform by example in the secondary schools.

Conferences would be developed along with other trappings of professionality, but teachers' claim to know about teaching—a key aspect of being a profession—had been effectively absorbed by the various university disciplines claiming to know more about teachers' work than they did. As Moore hits home, "that there is need for the careful consideration of such questions by the united body of experts, there is no doubt whatever." This need for experts was even independent of "whether or not the general suggestions which we have been considering this afternoon turn out to be desirable and practicable."[154]

Indeed, these various experts were the persons united around the centrality of "foundations," broadly construed but always removed from application, to teaching. They were also united around the vision of the active producer, and that the student should embody it; and simultaneously that it was other active producers (experts) who would need to lead the non-active producers (teachers) in facilitating them. Finally, they were also united in the fact that they would not be teaching any high school math classes themselves. This was not leading by example, but rather by prescription.

Akin to Dewey's interest, Moore's interest in education reform began petering out by 1904, as he committed himself more deeply to fulltime pure mathematics research.[155] By 1908, not only had Moore's engagement in education come to an end, but the phrase "laboratory method" had evaporated from the University of Chicago's math course catalogue. Moore was soon recommending that a new teacher of undergraduate students give "plenty of drill and quiz work."[156]

Professional organizations for math teachers would soon proliferate. Some mathematicians, particularly those holding teaching positions, would stay involved in this development. However,

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[150] Ibid., 450. See Leach, *American Education Reform and the Humanism of Mathematics,* 19 for a discussion on Osgood.
[151] Ibid., 228.
[152] Moore, "On the Foundations of Mathematics," 415-416.
[153] Ibid., 421.
[154] Ibid., 422.
[155] Roberts, *American Mathematicians as Educators*, 181 also points to the death of education advocate Harper in 1906 as a factor in the decline of Moore's interest in math education.
[156] Ibid., 225-226. Roberts explains that "drill and quiz work" should not be interpreted as a rejection of progressive methods, as it was in the context of being recommended "in addition to the formal instruction." That said, it also reveals a remarkable shift in Moore's language since he had addressed AMS.

the official stance of the American Mathematical Society, echoing Moore's career trajectory, was becoming increasingly "standoffish" by the 1903 National Education Association conference on mathematics education. Indeed, this standoffishness was perceived and returned by the normal school and school of education representatives, arguing that teachers (or rather the teacher educators standing in for them) knew much more than "mere scholars."[157] Experts in mathematics education would increasingly work under the auspices of schools of education, for example David Eugene Smith, in contrast to prior mathematics education experts such as J.W.A Young who had been employed by the University of Chicago math department.[158] At the international level, while the *International Commission on Mathematics Instruction* (ICMI) still included mathematicians such as Klein in its membership, ICMI would also serve to launch the field of mathematics education research.[159]

5. Self-Advocacy Through Experts: Unions and Associations for Mathematics Teachers

As the high school-going population exploded in the early 1900s, the bureaucratization of high school teaching exploded as well. [160] Whereas high school teachers were once accorded nearly professorial status, they were increasingly becoming a dime a dozen and subject to administrative control.[161] The elite of future high school teachers were increasingly getting their training in university schools of education rather than in the normal schools. In this context, professional organizations for high school teachers dramatically increased.

Content-related professional organizations and teachers' unions took up the representation of and advocacy for different aspects of teachers' work: teaching content versus work conditions and salaries. While both forms of organization made the claim that they were established by and for the "rank and file" of teachers and would work to establish teachers as the "active producers" of their own self-determination, they both included experts and envisioned the science of a pedagogy as a means of accomplishing this goal. In doing so, both unions and professional organizations would acquiesce to the view that teachers were "rote," either by nature of their work conditions or poor teaching, and asserted non-teaching experts as a means of mitigating against this. Working conditions and content-teaching had been, in some ways, divided and put under the organizational control of different but highly related groups of university experts.

By 1910 Carter Alexander would state that, "while the National Education Association attempts little here," "the movement for economic betterment of teachers is spreading across the cities, where it is very active, to the states, where many associations are now working."[162] Soon enough, not only state associations but even the NEA would have to concede to the demand to push for the economic betterment of teachers. Drawing on the experience of unionized urban

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[157] Ibid., 213-214.
[158] Roberts, *American Mathematicians as Educators*, 218.
[159] Fulvia Furinghetti, "Mathematics Education in the ICMI Perspective," *International Journal for the History of Mathematics Education* 3, no. 2 (2008), 47–56.
[160] The number of students in public high schools had increased by more than two and a half times between 1890 and 1900, had doubled again between 1900 and 1912, and doubled and yet again between 1912 and 1920. On this point see Roberts, *American Mathematicians as Educators*, 242. Between 1900 to 1930, high school teachers went from being only 5 to constituting 25 percent of the teaching population in the United States. On this point see Howard J. Goold & Arvid J. Burke, "The Organized Teaching Profession," *Education in the States: Nationwide Development Since 1900: A project of the Council of Chief State School Officers,* eds. Edgar Fuller and Jim B. Pearson (Washington, DC: Council of Chief State School Officers, 1969), 651.
[161] Labaree, "Proletarianizing the High School Teacher."
[162] Carter Alexander, *Some Present Aspects of Teachers' Voluntary Associations in the United States* (New York: Columbia University, 1910), 2-3. The NEA would approve the Department of Classroom Teachers to promote teacher welfare (for example tenure and pensions) in 1913.

common schoolteachers, high school teachers were taking an interest in unionization toward improved class sizes, salaries, retirement and tenure.

Teacher unionists embraced teachers' active producer-hood against the sense that "constructive" initiatives emanated exclusively from administrators and experts. For example, the *American Teacher* magazine described, in their calls to begin a national organization affiliated with the American Federation of Labor, that "something constructive can be done by the teachers themselves." They were unequivocal in the need to deal with material issues for teachers such as "the size of classes, the unhygienic conditions of many schools, the excess of clerical labor, the salaries and ratings of teachers, and the lack of opportunity for professional improvement during tenure of office." In addition to these material claims, they also argued for teachers' expertise in teaching, "on the ground that teachers do the every-day work of teaching, and understand the conditions necessary for better teaching." [163]

However, even as the difference in working conditions between teachers and professors grew starker, teacher unionists held on to the progressive theorizing of professors such as Dewey. The vision of democracy through education gave teachers a laudable cause for their occupation and unions. Pedagogical theorizing emphasizing the freedom of the child could also be read as implying that teachers needed increased freedom from administrative efforts and material deficits that diminished their capacity to implement progressive pedagogy.[164]

Calls to establish the American Federation of Teachers (AFT) conveyed considerable ambivalence about the role of teachers in producing knowledge about teaching. In noting that "teachers will be able to contribute from their experience the best ideas for the adjustment of education to the needs of human living," *American Teacher* qualified this by explaining that teachers' contributions were contingent on teachers achieving "an intelligent outlook upon life."[165] The *American Teacher's "*Call to Organize" also advocated the "scientific study of educational experience, to the end that the lessons of past successes and failures in education may be known at all."[166] While teachers' experience was valuable, it would need to be interpreted and generalized by non-teaching experts. Early meetings for organizing the AFT took place at Teachers' College, and when the AFT was founded out of six original locals, Teachers' College professors including John Dewey and George Counts joined the union.

Similarly, regional organizations for mathematics teachers gradually conglomerated into an organization at the national level. New local organizations had been formed as attacks on the math curriculum from radical progressive professors accelerated and teachers and professors alike rallied to protect high school math courses. Needing to make some concessions to the view that math teaching so far had failed, associations would rhetorically make classroom teachers take the fall. Reform promised to reformulate mathematics teaching such that students could become the active producer, reinvigorating school mathematics, but only if teachers would change their presumably rote practices to be in accord with university professors.

The largest three associations for mathematics teachers in the United States by the end of the first decade of the 1900s were the regional Association of Mathematics Teachers in New England, founded in 1902; the Association of Teachers of Mathematics in the Middle States and Maryland, founded in 1904; and the Central Association of Science and Mathematics Teachers, founded in 1901. In 1906, the American Federation of Teachers of the Mathematical and Natural

[163] "A Call to Organize," *American Teacher* (February 1913): 27 (cited in Eaton, *The American Federation of Teachers,* 13–14). *American Teacher* began publication in 1912 under editor Henry Linville in New York.
[164] On this see the discussion of Margaret Haley in Chapter 3.
[165] "Credimus," *American Teacher* (December 1912), 140 (cited in Eaton, *The American Federation of Teachers,* 12–13).
[166] "A Call to Organize," *American Teacher* (February 1913): 27 (cited in Eaton, *The American Federation of Teachers,* 13–14).

Sciences began to position itself as an umbrella organization for the various math and science teacher associations, but it did not last for long, and ultimately teacher professional organizations would trend toward increasing subject-specificity.

The publication of *School Mathematics*, which had originally been a pamphlet within the Central Association's *School Science* marked an increased independence for mathematics teachers as the popularity of Herbartian correlation waned. While it should be noted that college professors in the early 1900s had still frequently gained experience in high school teaching during or before their doctoral training, a large number of the participants in *School Mathematics* were education experts at their time of writing or editing. The *School Mathematics* editors, George W. Myers and C.E. Linebarger, were respectively a professor of the "teaching of mathematics and astronomy" at the University of Chicago and a high school chemistry and physics teacher at Lake View High School in Chicago. Of the 12 associate editors on the first issue; 6 were college professors, two were normal state professors, and four were high school teachers at a university high school, a boarding school, and two public schools. Teachers contributed more technical papers (such as how to apply correlation or the laboratory method to particular topics) whereas professors would largely contribute ideological ones.

The numerical dominance of non-K-12 teachers in *School Mathematics* was reflected in the second issue in the opening editorial entitled "Practice Does Not Make Perfect."[167] In contrast to teacher unions' push against teacher ratings and for the single salary schedule -putting teacher *experience* at the center of teacher quality and educational improvement - the editorial argued for "the inadequacy of mere schoolroom practice as a full guarantee of professional excellence." This judgement was made on the basis of "the quality of service actually being rendered by many who have "grown old in the schoolroom," and the problem of "routinists in the mathematical classroom who have not tried a new idea for years."[168] Indeed, practice only "confirms bad habits, producing rigidity of thought and inability to advance" unless the teacher is interested in reform.[169] In other words, experience had a tendency to make a teacher rote. For the authors, the answer is "not so much practice as a certain quality of practice that counts as assets in footing up the teachers' qualifications… professional advance is in direct proportion to the degree of intelligence put into practice."[170]

However, the authors found the general situation gratifying "to one who studies the situation in American high schools," as a growing number of math teachers were "examining into their classroom practice with a view to reaching the thought life of their pupils" in order to make their subjects "educational factors in a high and true sense."[171] "Centers of pedagogical activity" were forming across the country, and "the best teachers of secondary schools and colleges are rapidly identifying themselves with these centers."[172] Rather than suggesting that teachers in centers of pedagogical activity share successful strategies with each other, the editorial suggests that teachers act like experts by finding fault with teaching, as a "true friend … points out to me an element of weakness in my teaching practice."[173] Teachers should additionally contribute to "saying and writing," as comments that "the best teachers are those who never say or write anything are only fond delusions of those whose feeble will power keeps them in this category."

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[167] "Editorial: Practice Does Not Make Perfect," *School Mathematics* 1 no. 2, (March 1904), 185-189.
[168] Ibid., 185.
[169] Ibid., 185.
[170] Ibid., 186.
[171] Ibid., 187.
[172] Ibid., 187.
[173] Ibid., 188.

Indeed, this delusion was "too often" a "respectable cloak[] for indolence or incompetency."[174] To be a non-rote teacher, one needed to act more like an expert, despite the ever-growing divide that experts were creating between teachers and themselves.

School Mathematics made space for a dissenting letter (albeit with "the spelling of the writer… retained throughout the letter"), "from P. Q., an experienced teacher and a holder of the Doctorate in Mathematics from a prominent Eastern university" requesting that the journal be discontinued.[175] The letter argues that, with the old methods, even if older teachers were not up for "the quirks and quibbles of modern pedagogy" or were deficient in mathematical knowledge, or in general could teach little, "at least they taught little well." Students were even taught to "manipulate correctly somewhat complicated algebra, and if geometry was taught a little too much by rote, it was after all taught so as to have an abiding place in the pupil's mind." The "old "pedagogy of grind," and the challenge of deduction … spite of its faults," was able to develop students' patience and will, fix their attention, and "secure work on the part of the student." Now the pedagogy of grind was "banished to limbo."[176]

New reform efforts generated an "utterly flabby, undeveloped, embryonic condition" in students, who dealt with

> often illy understood applications that the guiding principles, whose illustration was sought, are "As two grains of wheat hid in two bushels of chaff: You shall search all day ere you find them, and when you have them, they are not worth the search." At their worst, these methods, these fads degenerate into a "pedagogy of gush."[177]

For P.Q., in the concern about "drudgery," reformers had lost sight of the *aims* of mathematics education, meaning "*what* the pupil should be taught;" the mathematics. From knowing what mathematics was to be taught, the "*how*, the means, will take care of itself." Methods would "spring… from the teachers own resourcefulness in his daily work." The teacher would "study to perceive the germs of mathematical thought in the pupil and will little by little develop within him a mathematical mind, a mind that seeks for the why and wherefore of things, a mind that patiently, seriously, persistently works."[178] Indeed, this would occur in practice, because "there is already too much talk and writing."[179]

Math education reformers were preoccupied with the "aims" of mathematics instruction, albeit with a different meaning, as they were under increasing pressure to argue that high school mathematics had some utility for the average student. Rather than being able to do specific mathematical problems or demonstrate mathematical knowledge in the vein of P.Q. (i.e. "mathematical power"), reformers would focus on developing students' personal autonomy in ways that transcended the school (and Thorndike's studies on transfer). This was demonstrated in early issues of *The Mathematics Teacher,* which was founded in 1908 out of the Central Association of Teachers of Mathematics in the Middle States and Maryland, which were wholly absorbed in the aims of mathematics instruction; namely to produce active producers.

For example, in the first issue of *The Mathematics Teacher*, Arthur M. Curtis of Oneonta Normal School writes that the major point of teaching algebra is "to establish in the mind of the pupil the firm belief that he can of *himself* distinguish truth from error and to see to it that he

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[174] Ibid., 188.
[175] "Shall this Journal Be Discontinued?" *School Mathematics* 1 no. 2, (March, 1904), 226.
[176] Ibid., 226.
[177] Ibid., 226-227.
[178] Ibid., 227.
[179] Ibid., 227.

forms the habit of proving all things."[180] W. E. Bond of Potsdam Normal School advocated getting geometry students "*doing*" by modeling how to prove a few theorems and then giving them the time to prove the rest of the chapter's theorems on their own. This would counter the tendency "especially among the girls, [to] depend more upon *memory* than upon *reason"* and to depend on the "authority of the author".[181] Moreover the student would develop their individuality and gain "confidence in his own powers."[182] William E. Breckenridge at Stuyvesant High School advocates having students check their own work because a habit of accuracy is not only useful in future jobs, but helps students build their own intellectual authority apart from the teacher.[183]

Authors also overtly connected mathematics to ideas about rote labor. C.E. Biklé of Central High School in Syracuse describes his desire for "pupils to use methods that require thought rather than manual labor."[184] N. J. Lennes, mathematics instructor at Brown, writes about the olden days in which "the more distasteful the work the greater its disciplinary value." He sums up the ethic as follows:

> Theirs not to reason why,
> Theirs but to do and die,
> Into the valley of death
> Go the poor youngsters"[185]

But for Lennes "all this has radically changed" due to the new approach of awakening student interest in order to secure their best work. He notes that "President Eliot [Charles Eliot of Harvard] is often quoted as saying that any man who is worth his salt, whether he works with his brains alone or with his brains and hands, takes delight first in the work itself, second, in what he produces, and third, in what it will bring him."[186]

Notably, the variety of writers in this first volume also appeal to their own experience in applying the ideas they were writing about in their own math classrooms over a series of years. In contrast, mathematician and journal editor W. H. Metzler of Syracuse University begins the first issue of *Mathematics Teacher* by giving generalizations about teachers. For Metzler, while teachers generally know that "they should aim at mental power rather than knowledge of details… many teachers seem to think they are compelled by one circumstance or another to sacrifice their ideals and best judgement."[187] He announces that the purpose of the Central Association should be to take the position of "emancipating teachers of mathematics from these yokes of bondage which draw them from their proper ideals."[188] However, his method of "emancipating teachers" was to explain, one by one, why factors such as the push of college admissions examinations demanding facts and ground covered as well and the huge variety in students' knowledge of prerequisites would be null if teachers just taught better. For example, examinations will no longer be a burden but rather be enjoyable when teachers more adequately prepare the students.

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[180] Arthur M. Curtis, "What Should Be the Aims In Teaching Algebra and How to Attain Them," *Mathematics Teacher* 1, no. 1 (September 1908), 36.
[181] W. E. Bond, "The Aims in Teaching Geometry and How to Attain Them," *Mathematics Teacher* 1, no. 1 (September 1908), 31-32.
[182] Ibid., 35.
[183] William E. Breckenridge, "Checks, Their Use and Abuse," *Mathematics Teacher* 1, no. 1 (September 1908), 17-30.
[184] C. E. Biklé, "The Aims of Teaching Algebra and How to Attain Them," *Mathematics Teacher* 1, no. 3 (March 1909), 85.
[185] N. J. Lennes, "Modern Tendencies in the Teaching of Algebra," *Mathematics Teacher* 1, no. 3 (March 1909), 99.
[186] Ibid., 95.
[187] W. H. Metzler, "Where Shall We Place the Emphasis?" *Mathematics Teacher* 1, no. 1 (September 1908), 2.
[188] Ibid., 2.

National level organizations for those engaging in the relatively "rote" work of instruction were forming rapidly, as the American Mathematical Society continued to take a standoffish approach toward the attacks on mathematics education. On the other hand, professors were moving to organize outside of the National Education Association, and the Association of University Professors was formed in 1914. In 1915, as AMS determined that actions on math education would be "inadvisable," they also moved to form the Mathematical Association of America as a means of outsourcing pedagogical issues. A first task was a committee to determine the topics, teaching methods and aims for mathematical instruction, in order to inform math teacher training.[189]

The National Council of Teachers of Mathematics, focusing specifically on high school math teaching, was founded in 1920 out of the kernel of the Men's Mathematics Club of Chicago. The Men's Club was founded in 1914 as a means of organizing against threats to the math curriculum, with founding members including NCTM's first president Charles M. Austin of Oak Park High School, Herbert Slaught from the University of Chicago's math department, and Ernest Breslich from the University of Chicago High School. [190] The NCTM was formed under the auspices of utility for "rank and file math teachers." However, NCTM would include a wide variety of occupations, and even after NCTM requested and was allowed to take over *The Mathematics Teacher* as its official organ, the number of papers by university and normal school professors would continue to outnumber those of teachers.

The mathematics education community had also shifted tone since the beginnings of *The Mathematics Teacher* in 1908. While in 1908 a variety of authors had accommodated the "aims of mathematics" to the vision of the active producer as advocated by content-general education professors, as early as 1913 key players such as teacher William Betz were warning against excessive reform emanating from "superficial alarmists." Betz even went as far as to say that "we have neither proved nor disproved the formal discipline dogma," and in a more reactionary tone that "our policy of extending every educational opportunity to the masses has brought about a further lowering of standards."[191]

The emerging concern about the excesses of content-general progressivism corresponded with the emergence of mathematics education as a specific university discipline. At Teachers College, David Eugene Smith, who had begun his work as a mathematics education prior to the entrance of education professors Snedden and Kilpatrick, struggled with ever-increasing tensions with the radical reformism of the newer arrivals. Explaining the need for a National Council of Teachers of Mathematics, the 1921 January issue of *Mathematics Teacher* described that "high school mathematics courses have been assailed on every hand" by "so-called educational reformers" who, "not knowing the subject and its values, in many cases have thrown out mathematics altogether or made it entirely elective."[192] The editors would voice their support of "progressive teachers" in the same breath in which they announced their suspicion of "educational reformers."[193] Decreasing rote instruction was a worthy goal up and until the point that it threatened the place of mathematics in the curriculum.

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[189] Roberts, *American Mathematicians as Educators*, 264. The Mathematical Association of America would ultimately serve as the professional organization for college math teachers.
[190] Roberts, *American Mathematicians as Educators*, 260. Women were excluded from the club and founded their own high school mathematics club.
[191] George M. A. Stanic, "The Growing Crisis in Mathematics Education in the Early Twentieth Century," *Journal for Research in Mathematics Education* 17, no. 3 (May 1986), 222–224.
[192] C. M. Austin, "The National Council of Teachers of Mathematics," *Mathematics Teacher* 14, no. 1 (January 1921), 1.
[193] Ibid., 1.

At the same time, professional organizers had to acknowledge the doubts already established by progressives about the traditional aims of math instruction based in mental discipline; school math in its current state had little point. Organizers conceded to a disdain of "mental discipline," but didn't budge far before landing on the production of active producers as a new aim for mathematics. Someone also had to take the fall for the failures of past and present math instruction; the problem was not math itself but rather the rote teachers teaching it. However, with the intervention of various groups of experts, the problem could someday be solved. Despite claiming to be an organization for the "rank and file" math teachers, NCTM would harbor an ambivalence toward teachers as delivering rote instruction but potentially capable of become less so; contingent on acting like experts.

Teacher unions and content-related professional organizations had split of aspects of work in an attempt to make teachers less rote. In their claims about advocating for the "rank and file" of teachers, both teacher unions and professional organizations valued teachers' experience to some extent. Yet, even as they advocated for teachers taking matters into their own hands, they substantially included non-teaching experts and conceded that teachers were indeed rote, at least to some degree. Educational change-both improved working conditions and improved pedagogy-were contingent on teachers developing an "intelligent outlook," relying on non-teaching experts for scientific interpretation of their work, or mimicking expert practices. Even as professional organizations facilitated some teachers' participation in creating authoritative documents and self-advocacy, they also represented a division of teachers' work into roted portions focusing on work conditions and pedagogy under expert guidance.

6. Conclusion

This chapter considered the ways in which turn of the century education experts- and in particular those in the universities- generated a notion of mathematics education reform that was tied up with their efforts in distancing themselves from teachers' "rote" work. Even as emerging university education experts and mathematicians did not necessarily agree on the means by which the student should become an "active producer," they both contrasted idealized student learning with the purportedly rote work that teachers were both exposing students to and doing themselves. They also agreed that teachers needed pedagogical prescriptions from non-teaching experts; specifically, "active producers" who could lend their ideas on how to self-replicate themselves for teachers to apply.

Whereas mathematicians' work into the mid-1800s had often involved extensive calculation and was attached to applied contexts such as astronomy and/or embedded in working as a teacher, "pure" mathematics in the turn-of-the-century research university sought to distinguish itself from these "rote" tasks in favor of being more "active" and "productive." American mathematicians under the leadership of Sylvester took up a more inductive approach before turning to the abstract "foundations" of their field under the leadership of Moore.

University education experts, most specifically in our case Dewey, similarly drew on "foundations" in creating a theory of child development and learning based in the so-called foundations of civilization. Leveraging these foundations by connecting student learning to human occupations in various "stages" of history would help students avoid the kind of overly-formal, rote learning that was happening in schools at the hand of rote teachers. Whereas "foundations" according to education experts meant an increasingly concrete training for students, "foundations" for mathematicians dealt with an increasingly abstract orientation for

their work. However different, both of these "foundations" were similar in that they called for a decontextualized expertise apart teaching and application to develop them.

Despite the impracticality of playing at occupations, this pedagogical approach was held to be more practical for students than the "so-called practical" problems of commercial arithmetic. Mathematicians engaging in mathematics education reform would similarly argue against the rules and difficulty of commercial arithmetic for students in favor of a new form of "practical" mathematics which involved students interacting with familiar physical objects in order to perform calculations. Ironically, the "practical" approach to mathematics as enacted in the Dewey school gave way to rote instruction in an attempt to prepare students for college-entrance exams. The idealized "practical" approach to math instruction was not intended to be "practice-able" in a sustained way.

University experts in mathematics and education appropriated invocations of work such as "practicality," "activity" and "producing" into their pedagogical reform ideals while stereotyping working as a teacher, doing calculations and applied problems as "rote." Meanwhile, the high school teachers that they sought to intervene on were facing new working conditions due to the expansion and bureaucratization of public education, leading to teachers' efforts at unionization. And yet, even as teachers work toward their self-determination through professional organizations for unionization and mathematics, they conceded that they were indeed rote and drew on non-teaching experts in the effort.

The next and concluding section considers teachers' precarious location between mental and manual work as illuminated by the Covid-19 pandemic.

Chapter 5:
"What's wrong with these teachers?"

This dissertation was completed during the COVID-19 pandemic. I had re-entered the K-12 teaching force in 2019, just in time to experience Crisis Distance Learning. Districts and then states entered heated battles over distance learning, with many teachers' unions vehemently doing their best to maintain distance learning rather than advocating for hybrid or in-person teaching. A neighbor asked me, "what's wrong with these teachers?" Were teachers leveraging the devastation of the pandemic to get themselves an extended vacation? Parental, administrative, and even Governor Gavin Newsom's opposition to unions' efforts to avoid in-person school during a pandemic answered this question in the affirmative.

On the surface, debates over where instruction should occur were about safety. Keeping students out of school buildings was portrayed as a means of mitigating against the already extremely disproportionate effects of COVID on low-income communities of color. Debates were also about the mental toll on children missing out on socialization and traditional milestones like proms and graduations. Concern also emanated over children living with their families with substantially less state intervention, as domestic violence and food insecurity exploded. And yet, it was suddenly less clear how "essential" teachers' on-site work was, removed from the day-to-day expectations of pre-pandemic life.

Under the surface, debates about the location of teachers and students during teaching were about what kind of work teaching is. This felt very salient when the district that I work for attempted to demand that teachers teach Zoom classes from their classrooms, even if their classrooms did not have children in them. This was negotiated at length and ultimately teachers were able to continue to work at home if they were not assigned students. However, this meant disproportionately that high school teachers were at home whereas elementary school and special education teachers——who were assigned students—were onsite.

During the pandemic shutdown, most "manual" workers either had the option of working on site or being laid off. The production, delivery and sale of food and many other goods would go on, and there were few debates about whether these workers should stay at home or not, although sometimes the lack of personal protective equipment and hazard pay that they experienced were admonished. Simultaneously, "intellectual" or "professional" workers were able to work from the comforts of home. Indeed, many intellectual workers' jobs were revealed as not really needing a required location at all, with many companies opting to close offices and allow workers to work remotely. The wide variety of situations teachers found themselves in during COVID, from teaching fully from home to hybrid to in person, was revealing of the strange situation of teachers in the tension between "mental" and "manual" work.

It was even unclear if teachers working from home were working at all, as not only suggested by the extreme aggravation of many well-to-do parents, but also as suggested by the ambivalence of teachers themselves. Teachers in my union continually reminded each other that they did not need to "go back to work" because they had never stopped doing their jobs. On the one hand, teachers were just "intellectual" enough to oftentimes work from home during a pandemic and still collect a paycheck. On the other hand, teachers were just "manual" enough that many teachers still had to work onsite, and their efforts to work from home were perceived as "uppity" and entitled. The teaching force served as a strange microcosm for a broader dynamic in class relations.

The manualness of teaching—as it is constructed by experts as I have argued here—is about working with actual *children's bodies en masse*. That working in interaction with children's bodies is "rote" is not a necessity. Rather, the roting of teaching was an achievement and re-achievement of education experts in their efforts to establish a knowledge base about teaching that didn't involve doing it, or rather its "rote" elements.

The constellation of beliefs associated with progressive pedagogy, including empathy for "the child" as an ever-changing and yet environmentally specific individual and the desire for school learning to be anti-bureaucratic speak to the permanent contradictions between U.S. educational aspirations for developing students as individuals and the realities of the mass bureaucracy that we attempt to achieve this in.[1] In this way, progressive pedagogy is assured to have widespread appeal for as long as our mass primary and secondary school institutions persist and to speak to the working realities of teachers who attempt to achieve these educational aspirations within them. However, rather than acknowledging these contradictions, progressive pedagogy as enacted by experts blames the negative aspects of mass schooling on the discretion the teachers who work in it, ironically as a means of "professionalizing" them.

The absence of children in the spaces where knowledge about teaching is made was a historical achievement, from the school to the normal school's practice school to the university.[2] Experts portrayed work done with children's bodies by teachers who would condescend to do it as necessarily rote and uncreative. In doing so they portrayed their own work—liberated from the confines of social control, children's bodies and school bells and taking place primarily in the form of documents—as creative and exhibiting a stronger understanding of what teaching is than that of the people who teach.

Magali Sarfatti Larson theorized professions as maintained by the production of "professional producers" through university credentials. In this way, expertise is embodied in those who have undergone the right training. This dissertation suggests that the creation of the embodied professional producer the form of the pedagogical expert also entailed the construction of teachers as embodied non-producers.[3] Teachers are viewed as unable to develop valued teaching practices through their interactions with teaching and other teachers; rather, this is contingent on interactions with researchers that produce "teacher learning." Research assumes that teachers have a natural inclination toward rote instruction, even if they went through teacher education programs that trained them to do the opposite. In the best-case scenario, teachers are viewed as falling into rote instruction due to the pressures of standardized exams and pacing calendars. In the worst-case scenario, teachers fall into rote because they either can't comprehend student-centered pedagogy and how to do it or because they have a deficit-view of the students they are teaching. Education experts' view that teachers are inevitably rote is ironic in that education experts have given them roughly the same instructions for over 180 years. Many of the quotes presented in this dissertation could have been said today.

Indeed, the roting of teachers is part of the larger maintenance of the mental-manual distinction, as illustrated during the COVID-19 pandemic. It is dubious that a progressive pedagogy that has been leveraged toward the general disrespect of teachers' full capacity to know about their work could be a respectful (or even "liberatory") offering for the children of the

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[1] Jonathan Franklin's dissertation includes a literature review and discussion on the fact that "the teacher stands at the centre of liberal thought, and is responsible for both its promise and its limitations." Jonathan Franklin, "Those Who Can't: A Cultural History of Teacher-Phobia, 1789-1915," PhD diss., (New York University, 2018), 8.

[2] Many schools of education had laboratory schools until the 1950s and 1950s. See Andrew Gitlin, "The Double Bind of Teacher Education," *Teaching Education* 11, no. 1 (2000), 27.

[3] Larson, *The Rise of Professionalism.*

United States. Progressive pedagogy promotes a zero-sum and capitalized vision of humans' intellectual resources, in that supposed wins for students are the spoils from teachers' right to say something about their work. The demand for teacher professionalism through progressive pedagogy is a broader part of "professionalism for everyone" (better described as better productivity for everyone) even as in the same move, higher education reproduces a distinction between intellectual workers and workers who will never be "professional."[4]

In Chapter 2, I argued that, even though the progressive "science of pedagogy" was originally claimed to have sprung from the extensive teaching experience of the experts writing textbooks on it prior to the Civil War, teachers and their experience were gradually eviscerated from it. That said, even early pedagogical experts stereotyped teachers as wasting their discretion on being overly disciplinarian, promoting rote instruction, and being morally and intellectually underqualified. After the Civil War and amidst the feminization of the teaching force, pedagogical experts imported Pestalozzian and Herbartian methods from Europe as normal school training (and thus normal school professors) rapidly expanded. Despite their short stints in teaching, Pestalozzi and Herbart were held to have exceptional perceptive and philosophical powers, respectively. They provided the prototype for pedagogical experts to be everything that supposedly unintelligent, disciplinarian and overall rote teachers were not. As the science of pedagogy made its way to the university, teaching experience was wholly irrelevant to the scientific study of the child, which could be undertaken in a laboratory and still offer pedagogical recommendations against rote instruction. The development and redevelopment of science of pedagogy was built on the exclusion of teachers from being able to participate in it.

Chapter 3 builds on the eclipse of teacher experience by focusing in on the perception of teachers as rote. Even as Dewey attempted to reconcile the distinction between mental and manual labor through his concepts of "doing" and "experience," he reinforced it. Real "doing" was something that could only truly happen in rarified academic contexts; for example in professors' free time for research and away from teaching, in writing authoritative texts rather than in teaching practice, in the training of educational experts apart from teachers, and in the university laboratory school rather than in Chicago public schools. Through "doing," Dewey abstracted the productive aspects of labor and appropriated them into professors' and students' idealized academic work. Activities like teaching and manual work were rendered rote or "doing something in particular" in Dewey's reconstruction.

Chapter 4 considers that, rather than being unique to schools of education, the pursuit of increasingly abstract areas of investigation was a part of the development of pure mathematics at new research universities as well. Turn of the century mathematicians saw pure mathematics as active, creative, demonstrating deep understanding, requiring considerable free time, and the opposite of rote work, which included teaching duties, applications and calculations. Through this construction, mathematicians sought to draw greater distinction between their work and that of high school teachers. At the same time mathematicians, particularly at the University of Chicago, began offering pedagogical prescriptions (rather than just content prescriptions) for high school teachers in the form of progressive pedagogy. In contrast to typical overly rote instruction, mathematicians drew from pedagogical experts in recommending "practical" math, which would help students become more like mathematicians in that they would be active producers of mathematics, but through concrete experiences rather than extreme abstraction.

[4] On the relationship between professionalization for everyone (what they refer to as the 'artistic critique' of capitalism and decreased job stability and benefits for everyone see Luc Boltanski & Ève Chiapello, *The New Spirit of Capitalism* (London: Verso, 2005).

Both mathematicians and pedagogical experts were found to develop deeper "foundations" for their respective fields. For mathematicians, this led to the study of arithmetic and geometry through increasingly abstract methods. For pedagogical experts, this led to an abstract philosophy of human development. Both fields claimed to have gained a more "foundational" understanding through increased abstraction that was envisioned as creative and productive and that required removal from teaching duties, applications and work considered "rote" or uncreative in general. This phenomenon has not been unique to mathematics or pedagogical expertise but rather is general to university academic disciplines.[5]

Ironically, both pedagogical experts and mathematicians were able to translate their new abstract developments into demands that teachers teach a more "practical" school mathematics to students in the interest of avoiding rote work. In this way, and even as university experts removed themselves from actual practical work, they were able to appropriate the productive aspects of labor as "practical" into their expertise. In doing so, they reinforced the division of mental and manual labor even as they critiqued it.

Each step of the way, experts' adoption of progressive pedagogy on behalf of students was tied up in their desire to differentiate themselves from teachers in the public eye and in their actual work. The continuing desire for the progressive pedagogical reform of mathematics education certainly has to do with our hopes and dreams for students, but it also has to do with the continued interest of pedagogical experts in maintaining their form of non-teaching expertise over teaching. That progressive pedagogy has gained the most traction in mathematics education is as much about what mathematics—with its legendary abstraction and propensity toward rote—can do for pedagogical expertise as it is about what progressive pedagogy can do for mathematics. Progressive pedagogy will never actually be achieved in mathematics classrooms by experts' judgement, not because teachers are incapable of doing it, but because of pedagogical experts' investment in the idea that teachers are rote workers and need expert intervention.

This dissertation is a part of a broader book project which, in addition to considering progressive pedagogy as expressed by normal schools, schools of education and university disciplines, also considers the role of teacher professional organizations for teachers and teacher unions in roting teachers' work. This investigation extends my project into the "New Math Era" of the late 1950s and the early 1960s, and into the neoliberal turn in teacher unionism which came into full fledge in the mid 1980s. The National Council of Teachers of Mathematics drew on a variety of social problems as a rationale for the roting of teachers. I also consider the role of school mathematics in various controversial reforms that Albert Shanker advocated in the 1980s, for example merit pay and national curriculum standards. In this way, I also argue that the expansion of union bureaucracy has played a role in the "roting" of teachers.

Improving Teaching?

Current mathematics education research has come a long way in the ways it envisions teachers since the 80s and 90s. Mathematics education research since the 1970s has exhibited a progression from viewing the child and the teacher as whole-heartedly problematic and having a

[5] For example, Louis Menand argues that the "New Criticism," a school of literary criticism in post-World War II universities in the United States, viewed texts as autonomous aesthetic objects. Textual interpretation required close reading by skilled critics rather than contextual information about the author and the background of the text. There are considerable parallels between Menand's account, the treatment of "the child" by pedagogical experts and the treatment of mathematical systems such as arithmetic and geometry by pure mathematicians. However, in the case of education, the abstractification of objects of study has a larger effect on classrooms. See Louis Menand, *The Free World: Art and Thought in the Cold War* (New York: Farrar, Straus, Giroux, 2021).

tendency toward rote, to viewing the child as productive if only the teacher would be less rote, to building a more empathetic view of teachers as potentially capable in the case that "Teacher Learning" is achieved. And yet, the demand that Teachers Learn to enhance student agency from an unnamed authority continues to perpetuate the roting of teachers.

I would argue that the roting of teachers limits the efficacy of education research more than that of teachers because research is not doing what it claims to do; improve teacher practice. That said, roting teachers has effects on teachers and teaching by stripping them of any authority to advocate for their own work in ways that could benefit their practice. The vision of teachers as rote also affects the allocation of resources of time and money, in turn affecting teachers' capacity to collaborate and reflect on their work. Considerable amounts of money and time are granted to education research which could also be fueled into continually underfunded public schools.

In *The Teaching Gap*, James Stigler and James Hiebert argue that teachers should be granted "material" boosts, for example providing teachers with two hours a week for studying, toward the development of standard practice "in-house."[6] The expenditure of study time by teachers would not necessarily (and probably should not) meet researchers' expectations for producing documents as the primary outcome of educational improvement. Currently, teachers not only don't have any time to do research but also have very little time to do any reflection on their practice at all. Despite the concern about rote teaching practice, U.S. education research takes no issue with the limits on teachers' time and energy to reflect on their practice created by teaching five periods of 30-some children a day. An intense daily schedule is a major factor affecting teachers' longevity in their jobs, thus limiting the extent to which teachers can learn from experience. Indeed, teaching may not actually be rote, but it is often a grind.

Teacher education also is housed primarily in schools of education, whose universities are granted substantial tuition toward educating future teachers. These teachers-in-training are then sent into "the field" to analyze practicing teachers based on the ideals of university professors before they attempt to practice teaching. A contrasting model (harkening back to the 1800s) would be for teacher education to be more substantially based *in* local schools. First, public schools could substantially benefit from the tuition money paid by teachers in training. Second, basing training in the practice of experienced teachers rather than the analysis of practicing teachers would promote the idea that teachers have knowledge, which could potentially gain more credibility for teachers than an affiliation with universities perpetuating the idea that teachers don't have knowledge. Third, teachers could be much more responsive to the particular communities they would be working in rather than responsive first and foremost to what the university says about these communities in the abstract.

The continued importation of pedagogical reforms reveals the enduring bias of pedagogical experts in the U.S. toward teachers. Japan's school mathematics has often been very favorably contrasted to that in the United States. Due to this, U.S. mathematics education researchers have imported the Japanese practice of "Lesson study," through which teachers co-develop lessons and observe each other teaching them. However, imported into the U.S. context, lesson study is a process in which teachers' study is led by mathematics education researchers rather than one that requires extra preparatory and collaboration time for teachers. As one widely cited paper explains, (non-teaching) experts are needed to understand the more abstract issue of "how the

[6] James W. Stigler & James Hiebert, *The Teaching Gap: Best Ideas from the World's Teachers for Improving Education in the Classroom* (New York: Free Press, 1999), 160-174. See also Andrew Gitlin, "The Double Bind of Teacher Education," *Teaching Education* 11, no. 1 (2000), 25-30.

innovation works," or to grasp the "essential features" of lesson study. Non-teachers are also needed to mitigate against any faulty or "wishful thinking" on the part of teachers.[7]

Even in the case that teachers decide to become education researchers, their teaching experience is viewed as a liability. In order to become effective researchers, ex-teachers must undergo a personal epistemological revolution.[8] Whereas the process of learning how to write authoritative documents about teaching promises to make ex-teachers an expert, there is little expectation that they should become better at teaching during this process.

While this dissertation provides few solutions to the problems of teacher education, it does point to a need to look at the role of not only schools of education, but the university at large in its relation to teachers, as the idea of university research was constructed in opposition to the idea of teaching. Scholars have often pointed to the "double-bind" of education research, which is stuck between the claim to generate useful knowledge for the teaching profession and the need to survive in the university, satisfying neither.[9] However, this runs the risk of naturalizing the university as a place of knowledge construction, even though it is the major producer and legitimator of class inequality.[10]

Contributions

As a part of the broader social and sociopolitical turns in mathematics education research, critical mathematics education researchers have subjected mathematics education research itself to the critical gaze through "research on research." [11] This has included a criticism of progressive pedagogy as objectifying students as decontextualized cognizers, of the expansion of the utility of mathematics as a school subject and of the ideological nature of the "mathematics for all" movement.[12] I contribute more specifically to work that has critiqued the constructivist ideal of the "active child" for its inherent classism, sexism, for being mythological and for constituting a mechanism of control.[13] While "research on research" has interrogated mathematics education in

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[7] Catherine Lewis, Rebecca Perry, Aki Murata, "How Should Research Contribute to Instructional Study," *Educational Researcher* 35, no. 3 (April 1, 2006), 5.

[8] David F. Labaree, "The Peculiar Problems of Preparing Educational Researchers," *Educational Researcher* 32, no. 4 (May 2003), 13-22.

[9] Schools of education have often been dropped from elite universities. For example, the department that Dewey helped establish at the University of Chicago is closed. See Clifford and Guthrie, *Ed School:*; Andrew Gitlin, "The Double Bind of Teacher Education,"; Labaree, "An uneasy relationship: the history of teacher education in the university,"; Labaree, *The trouble with ed schools* (New Haven: Yale University Press, 2004); .; Mirel, "Bridging the "Widest Street in the World": Reflections on the History of Teacher Education."

[10] Larson, *The Rise of Professionalism.*

[11] For research on research see Alexandre Pais and Paola Valero, "Researching research: mathematics education in the Political," *Educational Studies in Mathematics* 80 (2012), 9-24. For the social and sociopolitical turns see Stephen Lerman, "The Social Turn in mathematics education research," in J. Boaler (Ed.), *Multiple perspectives on mathematics teaching and learning* (Westport, CT: Ablex Publishing, 2000), 19-44 and Paola Valero, "Socio-political perspectives on mathematics education. In P. Valero & R. Zevenbergen (Eds.), *Researching the socio-political dimensions of mathematics education: Issues of power in theory and methodology* (Norwell, MA: Kluwer, 2004), 5-24.

[12] David Kollosche, "Social functions of mathematics education: a framework for socio-political studies," *Educational Studies in Mathematics* 98 (2018), 287-303; Paola Valero, "Mathematics for all, economic growth, and the making of the citizen-worker," in *Political Sociology and Transnational Educational Studies: The Styles of Reason Governing Teaching, Curriculum and Teacher Education,* eds. T. Popkewitz, J. Diaz., C. Kirchgasler (London: Routledge, 2016); Paola Valero, "The myth of the active learner: From cognitive to socio-political interpretations of students in mathematics classrooms," in *Proceedings of the Third International Mathematics Education and Society Conference* 2nd Edition*,* eds. Paola Valero and Ole Skovsmose (Copenhagen: Danmarks Pædagogiske Universitet, 2005), 489-500;

[13] For classism see Sarah Theule Lubienski, "Problem Solving as a Means Toward Mathematics for All: An Exploratory Look Through a Class Lens, *Journal for Research in Mathematics Education* 31, no. 4 (2000), 454-482; for sexism see Walkerdine, "Femininity as Performance,"; for ableism see Ayşe Yolcu, ""Modeling" in Mathematics Education: A Historical Encounter with

relation to broad political projects such as white institutional control and white supremacy, imperialism, settler colonialism, and capitalism, mathematics education researchers have rarely interrogated the ways in which research shapes the relationship between teachers and pedagogical experts.[14] Here, I participate in a growing trend of "historicizing" mathematics education research with an eye toward reconsidering its goals and orientations.[15]

This study also contributes to the historical study of progressive pedagogy and its appeal.[16] I take a broad view, methodologically looking for consistencies rather than debates amongst progressive pedagogy in order to consider this ideological constellation across institutions, from normal schools to university schools of education to mathematics research. This allows for the analysis of "the roting of work" in relation to the construction of academic work as productive across these institutions. Whereas histories of progressive pedagogy have often focused on internal accounts of schools of education and normal schools, here I convey the integral role of university disciplines through the case of mathematics.

Finally, this study can contribute to social studies of academic knowledge by considering the ways that academic knowledge production is shaped by occupational relations stretching outside of the bounds of the academy. This is in contrast to the view that the university is a relatively autonomous field.[17] Social studies of science have also often focused on change, whether it be due to paradigmatic revolutions or in response to shifting political terrain, but here I hope to demonstrate the value of studying "contemporary sciences of change that conserve," as Thomas Popkewitz puts it.[18]

Mathematics, Ability and Body," PhD diss., (University of Wisconsin-Madison, 2017); for mythology see Valero, "The myth of the active learner; and for a mechanism of control see Popkewitz, "The alchemy of the mathematics curriculum."

[14] For white institutional control and white supremacy see Danny B. Martin, "Race, racial projects, and mathematics education," *Journal for Research in Mathematics* Education 44, no. 1 (2013), 316-333; on imperialism see Alan Bishop, "Western mathematics: The secret weapon of cultural imperialism," *Race & Class* 32, no. 2 (1990), 51-65; on settler colonialism see Rochelle Gutiérrez, "Living Mathematx: Toward a vision for the future," paper presented at the 38th Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education (Indianapolis: Oct 5-8, 2017); on capitalism see Alexandre Pais, "Economy: the absent centre of mathematics education," *ZDM* 46 (2014), 1085-1093. For scholars who have noted the "colonizing gaze" of the researcher on the practices of math teachers see Anna Chronaki, "Researching the school mathematics culture of "Others." In P. Valero & R. Zevenbergen (Eds.), *Researching the socio-political dimensions of mathematics education: Issues of power in theory and methodology* (Boston: Kluwer Academic Publishers, 2004) and Lisa Jean Darragh, "Fears and desires: Researching teachers in neoliberal contexts," in A. Chronaki (Ed.), *Mathematics Education in life and times of crisis: Proceedings of the ninth international mathematics education and society conference* (Volos, Greece: University of Thessaly, 2017), 227-231. For work interrogating the ways in which policy documents control teacher subjectivity see Alex Montecino and Paola Valero, "Mathematics Teachers as Products and Agents: To Be and Not To Be. That's the Point!" In Hauke Straehler-Pohl, Nina Bohlmann and Alexandre Pais (Eds.), *The Disorder of Mathematics Education* (Cham, Switzerland: Springer International Publishing, 2017), 135-152.

[15] For examples of historical work in critical mathematics education see Erika C. Bullock, "An Archaeological/Genealogical Historical Analysis of the National Council of Teachers of Mathematics Standards Documents," PhD diss., (Georgia State University, 2013), Sverker Lundin, *Mechanism, understanding and silent practice in the teaching of arithmetic. On the intention, critique and defense of Carl Alfred Nyström's* Digit-Arithmetic *1853-1888* (Gothenberg, Sweden: University of Gothenberg Department of Philosophy, Linguistics and Theory of Science, 2012); Daniel Tröhler, *Pestalozzi and the Educationalization of the World* (London Palgrave MacMillan, 2013); Ayşe Yolcu, ""Modeling" in Mathematics Education: A Historical Encounter with Mathematics, Ability and Body," PhD diss., (University of Wisconsin-Madison, 2017). For commentary on the increasing popularity of historical investigations on mathematics education see Alexander Karp & Fulvia Furinghetti, "Introduction," in Alexander Karp and Fulvia Furinghetti (Eds.), *History of Mathematics Teaching and Learning: Achievements, Problems, Prospects* (London: Springer Open, 2016), 1-2.

[16] For example, David F. Labaree, "Progressivism, Schools and Schools of Education: An American Romance,"; William J. Reese, "The Origins of Progressive Education," *History of Education Quarterly* 41, no. 1 (Spring 2001), vi+1-24.

[17] Pierre Bourdieu, *Homo Academicus* (Paris: Editions de Minuit, 1984).

[18] The canonical example of studying change in science is Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1962). On stability in science see Thomas S. Popkewitz, *The Impracticality of Practical Research: A History of Contemporary Sciences of Change That Conserve* (Ann Arbor: University of Michigan Press, 2020).

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